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AIR QUALITY SURVEYS OF 1989 IN THE VICINITY OF THE PORT CREDIT (TEXACO) LAND RECLAMATION AREA AND THE MISSISSAUGA AREA SURROUNDING THE PETRO-CANADA REFINERY (MEADOW WOOD) AND THE ST.LAWRENCE CEMENT PLANT AT SOUTHDOWN ROAD AND LAKESHORE WEST

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Report prepared by:
Ronald Bell
Field Support and Methods Development
Air Resources Branch

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EXECUTIVE SUMMARY

In June and September of 1989, three separate air quality studies were conducted in Port Credit and Mississauga in response to odour complaints and concerns over possible health effects from residents who live in the vicinity of the Texaco land reclamation project in Port Credit and in the vicinity of the St. Lawrence Cement plant and Petro-Canada refinery areas of Mississauga. (A map of this study area is shown in Figure 1, page iii.)

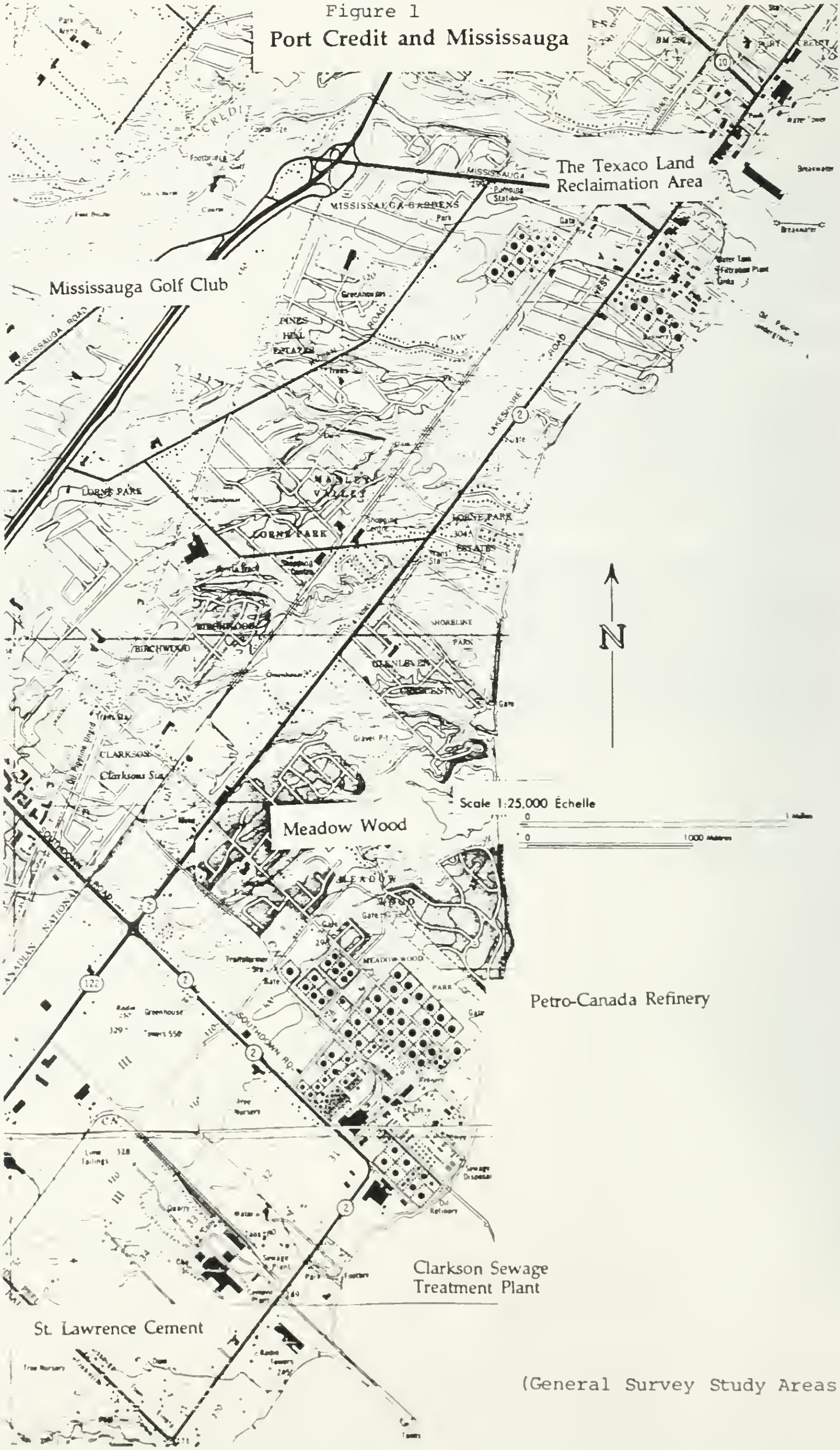
Odour was the main concern at the land reclamation project whereas health was the major concern in the latter two areas.

A considerable amount of air quality data was acquired during these studies and in summary, the measured ambient concentrations of selected gaseous common contaminants, volatile organic contaminants, polychlorinated biphenyls, chlorinated organics, chlorinated benzenes, dioxins and furans were found to be low and similar to other work the Ministry has done in other urban airsheds. Very little odour was detected in these areas and all measured concentrations were found to be less than the applicable Ministry air quality guidelines, criteria or standards.

It should be mentioned that there are several other significant sources of organics in and upwind of these study areas; namely vehicular traffic (the QEW, Queensway, Lakeshore Road, etc.), other refineries, sewage treatment plants, fibreglass and asphalt companies, food outlets and long-range transport from other urban industrialized areas in southern Ontario and the United States. These influences resulted in similar upwind and downwind ambient air concentrations being detected during all three studies.

Figure 1

Port Credit and Mississauga



(General Survey Study Areas)

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Industries in the Clarkson Area

1.0 Introduction:

The Air Resources Branch conducted ambient air quality surveys in the vicinity of the Texaco refinery decommissioning/land reclamation project in Port Credit and in the vicinity of the St. Lawrence Cement plant and Petro-Canada refinery located at Southdown Road and Lakeshore West in Mississauga during the summer and fall of 1989.

Odour complaints and concern over possible health effects were expressed by residents in the areas surrounding these industries and as a result, these surveys examined the local air quality, including measurements of a number of inorganic and toxic organic pollutants (incl. benzene, dioxins, polychlorinated biphenyls, furans, etc.).

2.0 Background:

2.1 The Texaco Refinery Study (Port Credit) (Appendix B)

This refinery complex stretches from Lake Ontario to Indian Road at Mississauga and Lakeshore Roads and occupies nearly 220 acres. At one time the facilities at this refinery included a variety of processing equipment, treating units, storage tanks and a substantial support infrastructure. The original plant was built in 1932 and the peak activity period was in the mid-seventies during which time 24 different products were produced and approximately 50,000 barrels of crude oil were processed daily.

As noted on the area map (Figure 2), this refinery complex was divided into 3 sectors dependent on the activities and equipment involved. The South Property (75 acres) extended from the lakefront to Lakeshore Road and contained processing equipment and storage tanks. The Marketing area (13 acres) extended from Lakeshore Road northwest to the Canadian National Railway line and accommodated rail tank car and tank truck loading facilities, administrative and warehouse buildings, and garages. The North Property (133 acres) extended from the CN Railway tracks northwest to Indian Road and was comprised of an agricultural area (84 acres), a land farm (19 acres) and a north tank farm (30 acres).

During 1983 and 1984, a 4-stage decommissioning programme, complying with guidelines drafted by the Ministry of the Environment, was developed. This programme was started in 1985 and by the end of 1987, much of the equipment had been removed. By the summer of 1989, the programme was well into stage 3 (environmental investigations and clean-up) and the work on-site dealt mainly with treating of the soil for the purpose of removing odours.

At the time of the air quality study, soil was being removed from the Marketing and North Property areas to an aeration site in the South Property. Once the soil was properly aerated and tilled to remove residual hydrocarbon odours, it was then returned to the Marketing and North Property areas to be used as backfill. This soil treatment programme had been halted during the winter but had resumed in early spring. Odour complaints and concerns over possible health effects were received by the Ministry from nearby residents. As a result, the Air Resources Branch was requested to provide on-site information regarding concentration levels of selected VOCs (volatile organic compounds) and TRS (total reduced sulphur) compounds.

It should also be noted that a PCB (polychlorinated biphenyl) air quality survey was conducted at this refinery complex in 1987 when a mobile PCB destruction unit was on-site decontaminating several transformers containing PCBs. The monitoring unit was present during the entire decontamination process but no PCBs were detected. The average detection limit was 0.11 ug/m^3 for total (di- to pentachlorobiphenyls) PCBs and the Ministry 30-minute Guideline is 0.45 ug/m^3 (Report: ARB-163-87).

2.2 The St. Lawrence Cement Study (Mississauga) (Appendix C)

St. Lawrence Cement submitted a proposal to burn 700 tonnes/day of municipal garbage as refuse derived fuels (RDF). Monitoring of stack emissions at St. Lawrence Cement did not include specific tests for the breakdown components of the halogenated (in particular chlorinated) organic solvents that are being incinerated in the kiln. Reservations and concerns were expressed by the residents regarding this proposal and as a result, real-time ambient information was required downwind and in the fumigation zones of emissions from St. Lawrence Cement during incineration of RDFs. In particular, information was requested on ambient concentrations of VOCs (including selected chlorinated compounds), PCBs, PCDDs (dioxins), PCDFs (furans) and CCs (common contaminants).

In order to define the fumigation zones, assistance was received from the Atmospheric Model Development Unit of the Air Resources Branch. They indicated two expected fumigation areas for the monitoring period, namely 5 to 10 km north of St. Lawrence Cement and 5 to 10 km west of St. Lawrence Cement.

Apart from this study, the TAGA 3000 mobile air monitoring unit acquired 115 two-minute ambient air samples on-site (i.e. at St. Lawrence Cement) on May 29 and 30th of 1989. These air samples were analyzed immediately for PCBs but none were detected. The detection limits were 123 ng/m^3 on May 29 for total PCBs (di- to pentachlorobiphenyls) and 50 ng/m^3 on May 30th.

2.3 The Petro-Canada Refinery Study (Meadow Wood) (Appendix D)

A resident of Stonehaven Drive requested air quality information in the Meadow Wood area (adjacent to and eastnortheast of the Petro-Canada refinery) because of a possible link to the cancer deaths of two members of his immediate family. As a result of discussions with the Peel Regional Medical Officer of Health and the Ministry, this investigative air quality study of was proposed.

This air quality study was conducted during the last two weeks of September and its main goals were to:

(1) Determine air quality in the area such that the data may be used for further comparisons with other air quality studies conducted by the Air Resources Branch (ARB); for example,

> Report ARB-TDA # 51-80; a 1978 Air Quality Survey Report in Mississauga. The main purpose of this study was to characterize the environment downwind of Tricil Limited and the Gulf Canada (Clarkson) refinery. Inorganic common contaminants, particulate matter and selected VOCs were monitored in this area.

(2) Special emphasis was to be placed on monitoring gaseous emissions from the Petro-Canada Refinery located at Southdown Road and Lakeshore West.

(3) Special consideration was to be given in establishing air quality profiles along Stonehaven Drive and in the general Meadow Wood area.

(4) Specific air quality information on the following gaseous contaminants was requested;

- The CCs: namely, CO (carbon monoxide), TRS (total reduced sulphur), THC (total hydrocarbon compounds), THC-M (non-methane hydrocarbons), CH_4 (methane), NO_x (oxides of nitrogen), NO_2 (nitrogen dioxide), NO (nitrogen monoxide) and O_3 (ozone).
- Although the ambient air was screened for over 130 VOCs, information was submitted for only 33 specific aliphatic, aromatic and chlorinated compounds with special emphasis on the BTXs (benzene, toluene and xylenes), trichloromethane and chlorobenzene.
- PCDDs and PCDFs.
- CBs (chlorinated benzenes), chlorinated organics and PCBs.

3.0 Survey Strategy and Results

3.1 Strategy

The mobile air monitoring unit assigned to these surveys contained a variety of analyzers that enabled screening of the ambient air for 10 CCs (mainly inorganic) and over 130 different VOCs (see appendix A).

Prescreening was done prior to the start of each survey and as a result, the field GC (gas chromatograph) and other analytical systems were calibrated for the appropriate VOCs and CCs. The analytical methods together with a listing of the MDLs (minimal detection limits) and MQLs (minimal quantization limits) for the pertinent VOCs are also given in appendix A.

The monitoring unit also contained a complete ground-based meteorological station which continuously recorded wind direction and speed, temperature, humidity, solar radiation and barometric pressure.

In addition, other programmes were run concurrently with the monitoring unit's programme and these dealt with long-time ambient air sampling for PCBs, chlorinated organics, CBs, PCDDs and PCDFs. These samples were acquired at fixed sites and the analyses were done by the LSB (Lab Services Branch).

Furthermore, additional VOC samples were collected by the field staff through deployment of Gilian personnel pumps and the analyses were done at ARB's (Air Resources Branch's) main laboratory in Toronto.

It should also be noted that for the CCs, the results were continuously recorded; whereas for the VOCs, the samples were collected over one-hour periods; for the PCBs and CBs, the samples were collected over 24-hours; and for the PCDDs and PCDFs, the samples were collected over 48-hours.

A more detailed description of the specific monitoring capabilities of the monitoring unit is listed in appendix A. The gaseous contaminants together with applicable Ministry standards, criteria, guidelines and provisional guidelines are also presented in this same appendix.

3.2 Results:

3.2.1 The Texaco Refinery Study: (Appendix B)

General:

Although this study was scheduled for the last two weeks of June, due to poor weather conditions, the programme could only be carried out during the last week - June 26th to 30th. Ambient air monitoring was concerned with gaseous emissions from the Port Credit Texaco Land Reclamation project whose area is highlighted in the area map (Figure 2) of appendix B.

Meteorology:

No significant weather system moved through this area during this time. It was mainly sunny and very warm with the daily maximum ambient temperatures reaching 30°C. Daily monitoring was usually conducted between 11am and 4pm during which the prevailing winds were as follows: southwesterly at 5 to 10 km/hr on Monday and Tuesday; northwesterly at 5 to 20 km/hr on Wednesday and Thursday; and southwesterly at 5 to 10 km/hr on Friday.

CCs:

On Monday, Tuesday and Wednesday, the monitoring unit was positioned at Saddington Park, south on Mississauga Road and downwind of the aeration fields. Much activity was happening at the aeration fields (many diesel trucks, people, tractors, cranes, bulldozers, rototillers, etc.) but no odours were detected by the staff. For the CCs, no TRS was detected (i.e. if TRS compounds were present in the ambient air, they were at concentrations less than 0.002ppm (parts per million)) and the THC concentrations were below 2.0ppm.

On Thursday, an investigation of possible emissions from the land reclamation activity north of Lakeshore Road was undertaken. Here, the soil was being removed to be aerated at the fields south of Lakeshore Road and the treated soil was being returned and set as backfill. Under northerly winds, the monitoring unit moved to 125 High Street (near Harrison Avenue), directly downwind of the project. No odours were detected but there were many trucks, tractors and cranes at work on the site. For the CCs, no TRS compounds were detected and the THC concentrations ranged up to 2.2ppm.

On Friday, under southerly winds, the monitoring unit moved to the corner of Mississauga Road and Port Street, downwind of the aeration fields. No odours were detected and low concentrations of the aforementioned pollutants were again measured. Again no TRS was detected and THC concentrations averaged up to only 2ppm.

VOCs:

Ten VOC samples were acquired during Monday, Tuesday and Wednesday when the monitoring unit was at Saddington Park. The maximum number of different VOC identified in these samples was only 16 and usually the concentrations were at trace levels (ie. the VOC was detected at a concentration that was too small for a positive determination of amount). The dominant VOCs were the low-boiling alkanes (propane through hexane) with concentrations ranging up to 300 ug/m^3 and the low-boiling aromatics (benzene, toluene and xylenes) with concentrations ranging up to 30 ug/m^3. At these concentrations, none of the detected VOCs would cause odour problems in the area. The only chlorinated VOCs detected in these samples were 1,1,1-trichloroethane and chlorobenzene. Although these were detected in several samples, the concentrations were always less than 20 ug/m^3. As a point of interest, 1,1,1-trichloroethane is used as a pesticide (assumed to be the most likely source in this area) and as a metal degreasing agent. The Ministry Standard for this compound is 350,000 ug/m^3 and is based on health effects.

Four VOC samples were collected on Thursday, and the results were similar to those reported during the first 3 days of this study. Only a maximum of 9 different VOCs were detected in the samples and the concentrations were usually at trace levels. Again the major VOCs were the low-boiling alkanes (ranging up to 100 ug/m^3), aromatics (BTXs ranging up to 10 ug/m^3) and the chlorinated compounds 1,1,1-trichloroethane (trace amounts) and chlorobenzene (up to 14 ug/m^3).

On Friday, two VOC samples were acquired downwind at Mississauga Road. All concentrations were low and the results obtained were similar to those previously reported. A maximum of only 10 different VOCs were detected in the two samples and the concentrations ranged from trace amounts (1,1,1-trichloroethane) to 25 ug/m^3 (butane).

It should be mentioned that since the field staff could not detect any odours off-site downwind of the aeration fields, on-site sampling was also undertaken. No odours were even detected atop the aeration fields or at the excavation and backfill areas. Nevertheless several VOC samples were collected at these sites throughout the week (Samples: A281-3, A291-2 and A291-3). The analyses resulted in concentrations similar to those collected off-site and no VOCs were detected at concentrations that would give rise to any possible odour problems.

3.2.2 The St. Lawrence Cement Study: (Appendix C)

General:

As noted in area map (Figure 3), a considerable number of people live in the immediate vicinity of the St. Lawrence Cement plant; especially to the north and east. The following two criteria had to exist before any ambient monitoring was to commence and as a result, the programme was only carried out on June 7, 8, 12 and 14th.

i) Each day, St. Lawrence Cement had to be incinerating waste solvents (usually in Kiln #3)

ii) and each day, the winds had to be southerly or easterly (i.e. an onshore flow).

As mentioned earlier, a complete air quality profile was requested for this area during the incineration programme. In particular, information was requested on ambient concentrations of CCs, VOCs, PCBs, chlorinated organics and CBs, PCDDs and PCDFs.

In order to acquire the necessary information, two Dioxin samplers and one PCB sampler were placed in the first expected fumigation area (at the Mississauga Golf Club, just north of the QEW); a second PCB sampler was placed in the second fumigation area (at the White Oaks Golf Club on Dundas Street, west of the Ninth Line); and a third Dioxin sampler and a third PCB sampler were placed at an upwind site (at Appleby College; 8km southwest of St. Lawrence Cement and south of Lakeshore Road) (Figure 4).

Apart from the above network, a mobile monitoring programme was also carried out. This meant that the monitoring unit was active in the field; moving to appropriate areas and gathering ambient data on VOCs, CCs and meteorological parameters (in particular wind speed and direction).

Meteorology:

For June 7th, 8th and 12th, the ambient temperatures were in the mid twenties and the winds were southeasterly at 10 to 15 km/hr.

For June 14th, the ambient temperature was in the high teens and the winds were easterly and brisk at 30 to 40 km/hr. It was mainly cloudy and there was a chance of a shower.

CCs:

As noted in appendix C, common contaminant data was acquired during 5 different monitoring periods: A072 - in Parking Lot #4 at Erindale College; A081 and A121 - approximately 0.3 km south of Burnhamthorpe on Central Parkway; and A142 and A143 - the White Oaks Golf Course on Dundas West at the 4th Line.

Approximately 12 hours of CC data were acquired during these periods but the concentrations were all low and comparable to other urban environments that the Air Resources Branch (ARB) has investigated. As noted in the CC table, the maximum half-hour average concentrations of CO, THC and NO_x measured during these periods were only 1.1, 1.8 and 0.04 ppm respectively. In addition, no measurable amounts of SO_2 (sulphur dioxide) were detected at any time (the detection limit for SO_2 was set at 0.01 ppm).

VOCs:

Ten VOC samples were acquired by the mobile unit and analyzed in the field. From these analyses, a maximum of only 12 different VOCs was detected in any one sample and of these, only low concentrations were measured. The dominant VOCs were the low-boiling alkanes (propane through hexane) and aromatics (BTXs). The maximum concentration reported for any of the samples was only 177 ug/m^3 - butane. The benzene and toluene concentrations ranged up to 19 and 38 ug/m^3 respectively.

Six other VOC samples were acquired and later analyzed at the ARB laboratory by a similar gas chromatographic system. Again, concentrations of the selected VOCs were very low in these samples; the dominant ones being the low-boiling alkanes and aromatics. The maximum half-hour average concentration detected in any of these samples was only 43 ug/m^3 - butane.

As for the chlorinated VOCs, only trace amounts of 1,1,1-trichloroethane and chlorobenzene were detected in any of the above samples.

PCBs, Chlorinated Organics and CBs:

As noted in appendix C, four sets of samples were collected at Appleby College, White Oaks Golf Course and the Mississauga Golf Course.

For the PCBs, a field blank and travel blank accompanied each set and no PCBs were detected in any of these cartridges. For the exposed samples, only trace amounts of PCBs were measured (0.3 to 1.0 ng/m^3 total) at all 3 locations. The detection limit for total PCBs is 0.2 ng/m^3 and was based on 82 different isomers. The Ministry's applicable air quality guideline (based on health effects) is 150 ng/m^3 for an allowable maximum 24-hour average concentration.

Because St. Lawrence was incinerating chlorinated wastes, the PCB cartridges were also analyzed for the following chlorinated organics and CBs by the Lab Services Branch (LSB):

hexachloroethane, 1,3,5-trichlorobenzene, 1,2,4-trichlorobenzene,
hexachlorobutadiene, 1,2,3-trichlorobenzene, 2,4,5-trichlorotoluene,
2,3,6-trichlorotoluene, 1,2,3,5-tetrachlorobenzene, pentachlorobenzene,
1,2,4,5-tetrachlorobenzene, 2,6,a-trichlorotoluene, hexachlorobenzene,
1,2,3,4-tetrachlorobenzene and octachlorostyrene.

The detection for total CBs was 1 ng/m^3 and the quantization limit was set at 10 ng/m^3. As noted the PCB/CBs table, only one of the samples contained any CBs or chlorinated organics; that being collected at the White Oaks Golf Course on June 8th but its concentration was only a trace amount estimated to be 1 ng/m^3 based on pentachlorobenzene. It should be mentioned that the Ministry does not have a collective air quality standard, criterion nor guideline for these compounds.

Dioxins and Furans:

Again as noted in the PCDD/PCDF data table, 2 sample sets were acquired during this study; the first set being exposed from June 7 to 9th and the second set being exposed from June 12 to 14th. From the 4 cartridges collected at the Mississauga Golf Course, the concentrations of Dioxins and Furans ranged from 0.52 to 0.62 pgTEQ/m^3 (picograms Toxic Equivalents per cubic metre) and from the 2 cartridges collected at Appleby College, the concentrations were 0.29 to 0.37 pgTEQ/m^3. These concentrations are very low as the Ministry set an interim Guideline for Dioxins and Furans at 5 pgTEQ/m^3 as a maximum allowable one-year average concentration.

These data represent air quality information since the sampling was continuous over 48-hour periods and no specific source(s) could be ascertained. (It was thought that since the results at the Mississauga Golf Course were almost twice those reported from the Appleby College site, a more prominent source (other than St. Lawrence Cement) would be vehicular traffic along the Queen Elizabeth Way.)

During this study, monitoring was always conducted in the designated fumigation areas downwind of the cement plant. Visible confirmation of the St. Lawrence plume's point of impingement was not usually possible. St. Lawrence Cement uses coal to fire its kilns and as a result, SO_2 was thought to be a possible plume tracer. However, even this did not materialize as SO_2 was not detected at any time during the survey and therefore, one had to assume that the monitoring unit was positioned correctly in the appropriate fumigation area.

3.2.3 The Petro-Canada Refinery (Meadow Wood) Study: (Appendix D)

General:

Meadow Wood is adjacent to and northeast of the Petro-Canada Refinery located at the south end of Southdown Road in Mississauga (Figure 5). In order to respond to the concerns expressed by the residents in this area, the following programmes were carried out:

- The monitoring unit conducted daytime sampling for selected CCs and VOCs;
- overnight monitoring of CCs was conducted at the Clarkson Sewage Treatment Plant on Lakeshore West;
- VOC sampling was conducted on Stonehaven Drive with subsequent analyses carried out at ARB;
- TSP (Total Suspended Particulate) and PCB sampling was also conducted on Stonehaven Drive with analyses performed at LSB (Laboratory Services Branch);
- and TSP, PCB, Dioxin and Furan sampling were carried out at the Bradley Museum (Meadow Wood and Orr Streets) with analyses performed at LSB.

Meteorology

During the first week, the weather was dominated by a persistent high pressure ridge that remained essentially stationary over most of south central Ontario. It was generally clear and the winds were from the southeast 10 to 30 km/hr throughout most afternoons. The ambient temperatures were in the mid-twenties.

A frontal system pushed through the Mississauga area on Tuesday of the second week. As a result, the ambient temperatures fell to the mid to high teens and the winds were usually light and variable with a southwesterly component. There was some precipitation on Tuesday but other than that, the days were generally clear with a few afternoon fair-weather cumulus clouds.

CCs:

As noted in the common contaminant data table, approximately 173 hours of data was acquired during 22 different monitoring periods. Of these data, approximately 150 hours (8 monitoring periods) were acquired overnight at the Clarkson Sewage Treatment plant on Lakeshore West; approximately 20 hours (11 monitoring periods) were acquired downwind of the Petro-Canada refinery complex; and just over 4 hours were acquired directly upwind of this refinery.

As mentioned earlier, the common contaminants measured were CO, TRS, THC, SO_2, TH-M, CH_4, NO_x, NO_2, NO and O_3. Some significant concentrations of TRS were measured (0.04 ppm) downwind of the refinery when the monitoring unit was at the Bradley Museum (a weak reduced sulphur odour was detected by the field staff at that time) and some significant concentrations of CO (2.9), THC (3.3) and NO_x (0.31) were measured when the unit was at the Clarkson Sewage Treatment plant. In general, the concentrations were akin to other measurements done by ARB and other investigative groups in a heavy industrialized urban airshed. Although some of the measured CC concentrations were significant, none of the applicable Ministry guidelines or criteria were exceeded for any of these contaminants.

VOCs:

As noted in the VOC sampling table, 14 VOC samples were acquired and analyzed by the mobile monitoring unit in the field. The majority of the samples were acquired either on Stonehaven Drive or at the Bradley Museum. Of the 14 samples, only 3 were acquired upwind. As noted in the VOC data table, only a maximum of 17 different VOCs was identified in these samples with the more dominant being the low-boiling alkanes and aromatics. For the alkanes, the maximum concentration detected was for butane at 190 ug/m^3 and for the aromatics, it was toluene at 34 ug/m^3. For the chlorinated compounds, only trace amounts of dichloromethane and 1,1,1-trichloroethane were detected.

Sixteen Gilian VOC samples were also collected during this study and these were later analyzed back at the ARB laboratory in Toronto. As noted in the VOC sampling table, 12 of the 16 samples were acquired concurrently with those collected by the mobile monitoring unit and as expected, the results obtained from these two cartridge sets were very similar. As shown in the VOC data table (ARB lab analyses), the maximum number of VOCs detected in any of the Gilian samples was only 13 and the measurable concentrations were all less than 80 ug/m^3. For the alkanes, the VOC with the maximum concentration was butane at 76 ug/m^3 and for the aromatics, it was toluene at 47 ug/m^3. For the chlorinated compounds, up to 26 ug/m^3 of tetrachloromethane and up to 7 ug/m^3 of 1,1,1-trichloroethane were detected. For the other chlorinated compounds, none or only trace amounts (viz. dichloromethane, chlorobenzene and tetrachloroethene) were detected.

On September 20th and 21st, the monitoring unit was directly downwind of the Petro-Canada refinery and a heavy oily odour was detected by the field staff. Some TRS was detected during the 20th, but in general, the odour was due to the oil refinery VOC emissions. As noted in the aforementioned tables, the highest VOC concentrations were measured during these 2 days. Analyses of the 6 downwind VOC samples revealed elevated concentrations of the low-boiling alkanes (butane up to 187 ug/m^3, propane up to 88 ug/m^3 and pentane up to 70 ug/m^3) and aromatics (benzene up to 21 ug/m^3 and toluene up to 34 ug/m^3). Analyses of the 2 upwind samples (at 1427hrs on the 21st) showed a definite decrease in the alkanes (butane at 86 ug/m^3 and only trace amounts of propane) and aromatics (only trace amounts of toluene). During both of these days, the winds were light southeasterly and the maximum afternoon temperatures were in the mid twenties. These were the only days of this study during which the field staff detected any odours in the vicinity of the Petro-Canada refinery.

PCBs, Chlorinated Organics and CBs:

For this programme, air sampler units were set up at the Bradley Museum and at 1653 Stonehaven Drive in the Meadow Wood area. Each sample was collected over a 24-hour period and during these two weeks, seven sets were collected and later analyzed by the LSB for the aforementioned chlorinated organics and PCBs. For this analyses, the detection limit for each compound was 1 ng/m^3 (nanogram per cubic metre). As noted in the PCB/CBs table, none of these organics were detected in any of the filters.

Dioxins and Furans:

One set of dioxin and furan sampler units was set up at the Bradley Museum. During the first week, the toxic equivalents for both the dioxin and furans were only 1.68 and 1.31 pgTEQ/m^3 respectively based on the LSB analyses of 2 sets of 48-hour samples. During the second week, only a single set of samples was acquired and from the subsequent analyses, the TEQ for both the dioxins and furan was only 0.56 pgTEQ/m^3. As with the PCDD/PCDF data acquired during the St. Lawrence Cement study, these concentrations were also very low as the Ministry set an interim air quality guideline for Dioxins and Furans at 5 pgTEQ/m^3 as a maximum allowable one-year average concentration.

4.0 Summary

In summary, the measured ambient concentrations of selected CCs, VOCs, PCBs, CBs, PCDDs and PCDFs were found to be low and similar to other work the Ministry has done in other urban airsheds. Very little odour was detected downwind of the specified sources and all measured concentrations were found to be less than the applicable Ministry air quality guidelines, criteria or standards.

During the Texaco refinery land reclamation study, no odours were detected off-site or on-site and the analytical results depicted no specific gaseous contaminants of concern.

During the St. Lawrence Cement study, the monitoring was always conducted in the designated fumigation areas downwind of the cement plant but visible confirmation of the St. Lawrence plume's point of impingement was not usually possible. One had to assume that the monitoring unit was positioned correctly in the appropriate fumigation area(s). Very low concentrations of the selected gaseous contaminants were detected and the analytical results depicted no specific contaminants of concern.

During the Petro-Canada study, the monitoring programme was conducted in the areas immediately to the east and northeast of this refinery. A slight odour of heavy oil was detected in these areas but the analyses depicted only slight elevated concentrations of the low-boiling alkanes, aromatics and chlorinated compounds.

In general, there are several other significant sources of organics in and upwind of these study areas; namely vehicular traffic (the QEW, Queensway, Lakeshore Road, etc), other refineries, sewage treatment plants, fibreglass and asphalt companies, food outlets and long-range transport of gaseous pollutants from the Hamilton and Niagara peninsula areas. A few of the sources are listed in appendix E and the influences were noted in the similarities of upwind and downwind ambient air samples acquired throughout these studies.

APPENDIX A

General

- ANALYTICAL CAPABILITIES
- QUALITY ASSURANCE AND QUALITY CONTROL (MDLs and MQLs)
- MOE AIR QUALITY STANDARDS, CRITERIA, GUIDELINES, ETC...

The Common Contaminants Monitored by the Mobile Air Monitoring Units

Total Hydrocarbons, Methane, Non-Methane Hydrocarbons, Carbon Dioxide, Sulphur Dioxide, Total Reduced Sulphur Compounds, Oxides of Nitrogen, Nitrogen Dioxide, Nitrogen Monoxide and Ozone.

The Meteorological Parameters Monitored by the Mobile Air Monitoring Units

Ambient Temperature, Relative Humidity, Wind Speed and Direction, Barometric Pressure and Solar Radiation.

The VOCs Contained in the Field and Lab GC Systems of ARB

The Aliphatics:

PROPANE, PROPADIENE, PROPYNE, CYCLOPROPANE, 2-METHYLPROPANE, 1-BUTENE, 1,3-BUTADIENE, BUTANE, 1-BUTYNE, 3-METHYL-1-BUTENE, 2-METHYLBUTANE, 2-METHYL-1-BUTENE, PENTANE, 2-METHYL-1,3-BUTADIENE, trans-2-PENTENE, cis-2-PENTENE,HYL-2-BUTENE, 2,2-DIMETHYLBUTANE, 3-METHYL-1-PENTENE, 4-METHYL-1-PENTENE, CYCLOPENTANE, 2,3-DIMETHYLBUTANE, 2-METHYLPENTANE, 3-METHYLPENTANE, 1-HEXENE, HEXANE, METHYLCYCLOPENTANE, 2,2-DIMETHYLPENTANE, 2,4-DIMETHYLPENTANE, 2,3-DIMETHYLPENTANE, 2-METHYLHEXANE, CYCLOHEXENE, DIBROMOMETHANE, 3,3-DIMETHYLPENTANE, CYCLOHEXANE, 3-METHYLHEXANE, 2,2,4-TRIMETHYLPENTANE, 1-HEPTENE, HEPTANE, trans-2-HEPTENE, METHYLCYCLOHEXANE, 2,2-DIMETHYLHEXANE, ETHYLCYCLOPENTANE, 4-METHYLCYCLOHEXENE, 2,5-DIMETHYLHEXANE, 2,3,4-TRIMETHYLPENTANE, 2-METHYLHEPTANE, 4-METHYLHEPTANE, cis-1,3-DIMETHYLCYCLOHEXANE, 3-METHYLHEPTANE, 1,2-DIBROMOETHANE, 1,1-DIMETHYLCYCLOHEXANE, 1-OCTENE, trans-1,2-DIMETHYLCYCLOHEXANE, trans-4-OCTENE, cis-1,4-DIMETHYLCYCLOHEXANE, OCTANE, trans-2-OCTENE, cis-1,2-DIMETHYLCYCLOHEXANE, ETHYLCYCLOHEXANE, 4-METHYLOCTANE, 2-METHYLOCTANE, 3-METHYLOCTANE, 1-NONENE, NONANE, tert-BUTYLCYCLOHEXANE, 1-DECENE, DECANE, BUTYLCYCLOHEXANE, UNDECANE, DODECANE and TRIDECANE

The Aromatics:

BENZENE, TOLUENE, ETHYLBENZENE, M,P-XYLENE, STYRENE, O-XYLENE, ISOPROPYLBENZENE, PROPYLBENZENE, 3-ETHYLTOLUENE, 4-ETHYLTOLUENE, 1,3,5-TRIMETHYLBENZENE, 2-ETHYLTOLUENE, tert-BUTYLBENZENE, 1,2,4-TRIMETHYLBENZENE, iso-BUTYLBENZENE, sec-BUTYLBENZENE, 1,2,3-TRIMETHYLBENZENE, 1-ISOPROPYL-4-METHYLBENZENE, INDAN, 1,3-DIETHYLBENZENE, 1,4-DIETHYLBENZENE, BUTYLBENZENE, 1,2-DIETHYLBENZENE, trans-DECAHYDRONAPHTHALENE, cis-DECAHYDRONAPHTHALENE, 1,2,3,5-TETRAMETHYLBENZENE, 1,2,3,4-TETRAMETHYLBENZENE, 1,3-DIISOPROPYLBENZENE, 1,2,3,4-TETRAHYDRONAPHTHALENE, 1,4-DIISOPROPYLBENZENE and NAPHTHALENE

The Chlorinated Organics:

CHLOROMETHANE, CHLOROETHANE, DICHLOROMETHANE, trans-1,2-DICHLOROETHENE, cis-1,2-DICHLOROETHENE, 2-CHLOROBUTANE, 1-CHLORO-2-METHYLPROPANE, TRICHLOROMETHANE, 3-CHLORO-2-METHYLPROPENE, 1,2-DICHLOROETHANE, 1,1,1-TRICHLOROETHANE, 1-CHLOROBUTANE, TETRACHLOROMETHANE, 1,2-DICHLOROPROPANE, TRICHLOROETHENE, 1-CHLOROPENTANE, 1,1,2-TRICHLOROETHANE, 1,3-DICHLOROPROPANE, TETRACHLOROETHENE, CHLOROBENZENE, 1-CHLOROHEXANE, 1,4-DICHLOROBUTANE, 1,1,2,2-TETRACHLOROETHANE, 1,2,3-TRICHLOROPROPANE, 2-CHLOROTOLUENE, 3-CHLOROTOLUENE, 4-CHLOROTOLUENE, 1,3-DICHLOROBENZENE, 1,2-DICHLOROBENZENE, 1,2,4-TRICHLOROBENZENE, CHLOROETHENE, 2,3-DICHLOROPROPENE and 1,5-DICHLOROPENTANE

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Quality Assurance (QA) and Quality Control (QC) for the VOC data set:

Although the field and laboratory gas chromatographic (GC) systems of ARB contained over 130 VOCs in their active libraries, in order to conduct a more meaningful and comprehensive programme, QA/QC parameters were determined for only 33 of the more prominent of these VOCs. In other words, although the air samples were screened for over 130 VOCs (qualitatively), identification and quantization only applied to the 11 n-alkanes and 22 other targeted VOCs listed in Tables 1a & 1b.

MDLs (Method Detection Limits) and MQLs (Method Quantization Limits) for the 33 VOCs were determined from analyses of 7 replicate spiked cartridges at concentrations which were known to be 5 to 10 times the minimal detectable area counts that could be determined by an experienced GC operator. At the 99% confidence level (based on the Student "t-Test"), the MDL for a particular VOC was defined to be 3 times the standard deviation of the concentrations derived from the aforementioned replicate samples and expressed in terms of nanogram (ng) loadings on the GC columns (that is: the FID (flame ionization detector) response to a direct GC column loading of a specific VOC). For a 3-litre sample air volume (a 30-minute sample acquired at a flow rate of 100 ml/min), the MDLs for the 21 targeted (unsaturated) VOCs and 11 n-alkanes ranged from 0.3 ug/m^3 (benzene from the lab GC) to 28 ug/m^3 (trichloromethane from the field GC). For the same sample volume and specified VOCs, the MQLs ranged from 1.7 to 138 ug/m^3. For a 6-litre air sample, the MDLs and MQLs ranged from 0.2 to 14 ug/m^3 and 0.9 to 69 ug/m^3 respectively (the last 2 columns of tables 1a and 1b). It should be noted that since the FID signal strength is directly proportional to GC column loading, as the air volume increases, lower concentrations of the 33 VOCs will be detected and quantized.

If one of the specific VOCs was detected at a concentration greater than the appropriate MDL but less than the appropriate MQL, a "T" was entered in the data tables. (Please note that "T" means a TRACE amount that was discernable on a chromatogram with a certain degree of confidence; in our case 99% - see diagram below.) If the VOC was detected at concentrations greater than the MQL, an amount was given.

```
FID (response)          MDL        "T"        MQL          Amount
  I                      I                     I
___________________________________________________________________

          =========== Concentration ===========>
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MAMU#1's MDLs and MQLs as set in 1989

			for a 30 min sample *		for a 60 min sample *	
The VOCs	Method Detection Limit ng	Method Quantitation Limit ng	MDL (ug/m3)	MQL (ug/m3)	MDL (ug/m3)	MQL (ug/m3)
1 Chloroethene	3.5	17.7	1.2	5.9	0.6	3.0
2 Dichloromethane	23.8	118.9	7.9	39.6	4.0	19.8
3 Trichloromethane	83.1	415.3	27.7	138.4	13.8	69.2
4 1,2-Dichloroethane	10.6	52.9	3.5	17.6	1.8	8.8
5 1,1,1-Trichloroethane	8.0	40.2	2.7	13.4	1.3	6.7
6 Benzene	4.5	22.7	1.5	7.6	0.8	3.8
7 Tetrachloromethane	15.0	75.0	5.0	25.0	2.5	12.5
8 Trichloroethene	14.0	70.2	4.7	23.4	2.3	11.7
9 Toluene	11.6	57.8	3.9	19.3	1.9	9.6
10 Tetrachloroethene	19.5	97.6	6.5	32.5	3.3	16.3
11 Chlorobenzene	6.4	32.2	2.1	10.7	1.1	5.4
12 Ethylbenzene	6.8	33.9	2.3	11.3	1.1	5.7
13 m-xylene	12.4	62.1	4.1	20.7	2.1	10.4
14 Styrene	5.9	29.7	2.0	9.9	1.0	4.9
15 o-xylene	5.4	27.0	1.8	9.0	0.9	4.5
16 1,1,2,2-Tetrachloroethane	34.4	171.9	11.5	57.3	5.7	28.6
17 1,2,4-Trimethylbenzene	13.8	69.0	4.6	23.0	2.3	11.5
18 1,3-Dichlorobenzene	18.3	91.4	6.1	30.5	3.0	15.2
19 1,2-Dichlorobenzene	19.1	95.6	6.4	31.9	3.2	15.9
20 1,2-Diethylbenzene	13.1	65.4	4.4	21.8	2.2	10.9
21 1,2,4-Trichlorobenzene	30.8	153.8	10.3	51.3	5.1	25.6
22 Naphthalene	31.3	156.4	10.4	52.1	5.2	26.1
The n-Alkanes						
propane	1.3	6.6	0.4	2.2	0.2	1.1
butane	7.3	36.7	2.4	12.2	1.2	6.1
pentane	5.5	27.4	1.8	9.1	0.9	4.6
hexane	3.4	16.9	1.1	5.6	0.6	2.8
heptane	3.8	19.0	1.3	6.3	0.6	3.2
octane	2.3	11.5	0.8	3.8	0.4	1.9
nonane	4.5	22.3	1.5	7.4	0.7	3.7
decane	5.6	27.9	1.9	9.3	0.9	4.7
undecane	11.0	55.2	3.7	18.4	1.8	9.2
dodecane	12.9	64.4	4.3	21.5	2.1	10.7
tridecane	6.3	31.7	2.1	10.6	1.1	5.3

Note: * - assumes sample flow rate is 100 ml/min

ARB Lab MQLs and MDLs as set in the Fall of 1989

The VOCs	Method Detection Limit (ng)	Method Quantitation Limit (ng)	for a 30-min sample *		for a 60-min sample *	
			MDL (ug/m3)	MQL (ug/m3)	MDL (ug/m3)	MQL (ug/m3)
1 Chloroethene	3.3	16.4	1.1	5.5	0.5	2.7
2 Dichloromethane	15.2	75.9	5.1	25.3	2.5	12.7
3 Trichloromethane	12.7	63.6	4.2	21.2	2.1	10.6
4 1,2-Dichloroethane	4.2	20.9	1.4	7.0	0.7	3.5
5 1,1,1-Trichloroethane	3.1	15.3	1.0	5.1	0.5	2.6
6 Benzene	1.0	5.2	0.3	1.7	0.2	0.9
7 Tetrachloromethane	8.9	44.4	3.0	14.8	1.5	7.4
8 Trichloroethene	5.5	27.6	1.8	9.2	0.9	4.6
9 Toluene	2.9	14.4	1.0	4.8	0.5	2.4
10 Tetrachloroethene	10.3	51.4	3.4	17.1	1.7	8.6
11 Chlorobenzene	4.4	22.1	1.5	7.4	0.7	3.7
12 Ethylbenzene	3.6	18.2	1.2	6.1	0.6	3.0
13 m-xylene	4.7	23.7	1.6	7.9	0.8	4.0
14 Styrene	6.6	33.0	2.2	11.0	1.1	5.5
15 o-xylene	3.3	16.4	1.1	5.5	0.5	2.7
16 1,1,2,2-Tetrachloroethane	37.4	186.8	12.5	62.3	6.2	31.1
17 1,2,4-Trimethylbenzene	10.6	53.2	3.5	17.7	1.8	8.9
18 1,3-Dichlorobenzene	20.8	103.9	6.9	34.6	3.5	17.3
19 1,2-Dichlorobenzene	22.3	111.5	7.4	37.2	3.7	18.6
20 1,2-Diethylbenzene	12.4	61.8	4.1	20.6	2.1	10.3
21 1,2,4-Trichlorobenzene	31.9	159.4	10.6	53.1	5.3	26.6
22 Naphthalene	39.8	199.0	13.3	66.3	6.6	33.2
For the n-Alkanes						
propane	6.5	32.6	2.2	10.9	1.1	5.4
butane	6.5	32.7	2.2	10.9	1.1	5.4
pentane	4.3	21.6	1.4	7.2	0.7	3.6
hexane	8.1	40.4	2.7	13.5	1.3	6.7
heptane	9.3	46.3	3.1	15.4	1.5	7.7
octane	5.4	27.0	1.8	9.0	0.9	4.5
nonane	6.1	30.7	2.0	10.2	1.0	5.1
decane	6.3	31.3	2.1	10.4	1.0	5.2
undecane	6.6	33.0	2.2	11.0	1.1	5.5
undecane	4.5	22.7	1.5	7.6	0.8	3.8
tridecane	3.3	16.3	1.1	5.4	0.5	2.7

NOTE: * - assumes sample flow rate is 100 ml/min

List of Ambient Air Quality Criteria, Standards, Interim Standards, Tentative Design Standards, Guidelines, and Provisional Guidelines as of

1 May 1990

1. New Interim Standards set on the 18 Sept. 89 meeting of the EASSC.

Zinc Chloride	12	10		H	IS
Trichlorofluoromethane	18000	6000		H	IS
Vinyl chloride	3	1		H	IS
		0.2	(6)		

2. Standards revoked by O.Reg.90/90 as of 23 Feb 90, marked "R".

Contaminant (CAS #)	POI .5h Av ug/m3		AAQC 24h Av ug/m3		LE	ST
Acetic Acid (64-19-7)	2500		2500		O	S
Acetophenone(98-86-2)			1167	(1)	H	TS
	625		850		O	TS
Acetylene (74-86-2)	56000		56000		O	S
Acrolein (107-02-8)	28		23.5		H	TS
Acetone (67-64-1)	48000		48000		O	S
Acrylamide (79-06-1)	45		15		H	S
"R" Acrylonitrile						
Acrylonitrile (107-13-1)	300		100		H	TS
N-Alkyltoluene Sulphonamide	100		120		T	PG
Alpha Naphthol (90153)	100		100		H	G
Alpha Methyl Styrene(98839)			24000	(1)	H	PG
	-		-		O	-
Aluminum Oxide(7429905)	100		120		T	PG
Ammonia (7664417)	3600		3600		O	S
n-amyl acetate	-		53200		H,O	TS
isoamyl acetate	-		53200		H,O	TS
secondary amyl acetate	-		66500		H,O	TS
Ammonium chloride(12125029)	100		120		T	PG
Antimony(7440360)	75		25		H	S
"R" Arsenic						
Arsenic(7440382)	1		.3		H	TS
Arsine (7784421)	10		5		H	S
Asbestos(1332214)	5	(#)	0.04	(9)	H	G
Barium-total (7440393) water soluble	30		10		H	G
"R" Benzene(71432)						
Benzo(a)pyrene(50328)	3.3	(16 ss)	0.3	(16,6 as)	H	PG
			1.1	(16,ss)		
			0.22	(16,6,ss)		
Benzothiazole(95169)	200		70		H	PG
Benzoyl Chloride(98884)	350		125		C,H	PG
Beryllium(7440417)	0.03		0.01		H	S
Biphenyl(92524)	60		60	(1)	O	G
Borax	100		33		H	TS
Boric Acid	100		33		H	TS
Boron Tribromide(10294334)	100		35		C	S

Boron Trichloride(10294345)	100		35		C	S
Boron Trifluoride(7637072)	5		2		V	S
Boron(7440428)	100		120		T	S
Bromacil(314409)	30		10		H	G
Bromine(7726956)	70		20		H	S
n-Butanol(71363)			15000	(1)	I	PG
	2278		3100	(18)	O	PG
			770		O	PG
Tertiary Butyl Alcohol			30300		H	PG
(75650)	-		-		O	-
n-Butyl Acetate*	15000		15000		I	PG
n-Butyl Acetate(123864)			15000	(1)	H	PG
	735		1000	(18)	O	PG
			248		O	PG
Butyl Acrylate(141322)	100		120		T	G
Butyl Stearate(123955)	100		120		T	G
Cadmium(7440439)	5		2		H	S
Calcium Carbide(75207)	20		10		W	PG
Calcium Cyanide(592018)@@	100		120		T	PG
Calcium Hydroxide(1305620)	27		13.5		C	S
Calcium Oxide(1305788)	20		10		C	S
Captan(133062)	75		25		H	PG
Carbon Black(1333864)	25		10		S	S
Carbon Disulphide(75150)	330		330		O	S
Carbon Monoxide(630080)	6000	(5ppm)	36200	(1)	H	S
			15700	(2)	Z	S
"R" Carbon Tetrachloride						
Carbon Tetrachloride(56235)	1800		600		H	G
Chloramben(133904)	100		120		T	PG
Chlordane(57749)	15		5		H	G
Chlorinated Dibenzo Dioxins, CDDs	450	(17)	30	(17,6)	H	PG
Mixtures of Chlorinated Dibenzo Dioxins and Chlorinated Dibenzo Furans, CDFs						
x/450 + y/450(50) = 1			x/30 + y/30(50) =1 (annual average)		H	PG
x=concentration (pg/m3) of CDDs in air						
y=concentration (pg/m3) of CDFs in air						
Chlorine(7782505)	300		150		H,V	S
Chlorine Dioxide(10049044)	85		30		H	S
Chlorodifluoromethane (Freon 22)(75456)	1.05M		350000		H	PG
Chloroform(67663)	1500		500		H	G
"R" Chromium						
Chromium(7440473) (Di, Tri, and Hexavalent forms)	5		1.5		H	PG
Citric Acid(77929)*	-		300	(1)	H	TS
Citric Acid	100		120		T	TS
Coal Tar Pitch Volatiles	3		1		H	PG
(soluble fraction)(8007452)			0.2	(6)		PG
Cobalt	300	(16)	100	(16)	H	TS
Copper(7440508)	100		50		H	S
Cresols(1319773)	230		75		H	S
Cyanogen Chloride(506774)	15		12		H	TS
Cyclo Sol 63	25000		5000		H	PG
Cyclohexane(110827)	300000		100000		H	G
Dalapon Sodium Salt(127208)	100		50		H	G
Decaborane(17702419)	50		25		H	S
n-Decane(124185)			60000	(1)	H	PG

	-	-		O	-
Decene-1(872059)	180000	60000		H	PG
"R" Detergent Enzyme (Subtilisin)					
Detergent Enzyme(1395217)	0.20	0.06		H	TS
Diacetone Alcohol(123422)	990	1350	(18)	O	PG
		335		O	PG
Diazinon(333415)	9	3		H	G
Diborane(19287457)	20	10		H	S
Dibutyltin Dilaurate(77587)	100	30		H	G
Diethylene Glycol	-	1400		H	TS
Monoethyl Ether(111900)	-	1400		H	TS
	800	1100	(18)	O	IS
	-	273		O	IS
Diethylene Glycol(112125)	-	-		O	-
Monoethyl Ether Acetate		1800		H	TS
Diethylene Glycol	-	-		O	-
Monobutyl Ether(112345)		65		H	TS
Diethylene Glycol(124174)	-	-		O	-
Monobutyl Ether Acetate		85		H	TS
3,3-Dichlorobenzidine(91941)	-	-		H	CAR
Di-C-7-9-11-Alkyl Phthalate (DAE)(39393-3708)	100	125		H	TS
Dicapryl Phthalate(131157)	100	500		T	S
Diisobutyl Ketone(108838)		3500		H	PG
	470	649	(1)	O	PG
		159		O	PG
Difluorodichloromethane (Freon 12)(75718)	1.5M	500000		H	PG
Dihexyl Phthalate (DHP)(84-75-3)	100	50		H	TS
1,1-Dichloro-1,1,2,2-tetrafluoro ethane (Freon 114)(1320372)	2.1M	700000		H	TS
n,n-dimethylacetamide	900	300		H	TS
Dimethyl Disulphide(624920)	40	40	(1)	O	S
n,n-dimethyl-1,3-	60	20		H	PG
diaminopropane(109557)		-		O	-
Dimethyl Ether(115106)	2100	2100		O	G
Dimethyl Methylphosphonate	-	-		O	-
(756796)		875		H	TS
Dimethyl Sulphide(75183)	30	30	(1)	O	S
Dimethyl Phthalate (DMP)(131-11-3)	100	125		H	TS
Dibutylamine(111922)	-	-		O	-
		2645	(1)	H	TS
Dibutyl Phthalate (DBP)(84-74-2)	100	50		H	TS
Diethylamine(109897)	-	-		O	-
		2910	(1)	H	TS
Diethyl Phthalate (DEP)(84-66-2)	100	125		H	TS
Dimethylamine(124403)	-	-		O	-
		1840	(1)	H	TS
Dioctyl Phthalate(117817)*	100	120		T	S
(Di-2-ethylhexyl Phthalate) (DEHP)(117817)	100	50		H	TS
Dioxane(123911)		3500		H	G
	-	-		O	-

Dioxolane(646060)	30		10		H	PG
Diphenylamine(122394)	50		17.5		H	TS
Diquat Dibromide(85007)res.	96	(16)	32	(16)	H	IS
-total in ambient air	480	(16)	160	(16)	H	IS
Dodecyl Benzene	100		120		T	PG
Sulphonic Acid(1886813)						
Dodine(24391003)	30		10		H	PG
Droperidol(548732)	3		1		H	PG
Dustfall	8000	@	7.0	(3,4)	S	S
			4.6	(5,6)		
Ethyl Acetate(141786)	19000		19000	(1)	O	S
Ethyl Acrylate(140885)	4.5		4.5	(1)	O	S
Ethyl Alcohol(64175)	19000		19000	(1)	O	G
Ethyl Benzene(100414)	4000		4000	(1)	O	S
Ethyl Ether(60297)	30000		30000		O,H	TS
Ethyl-3-ethoxy propionate	147		200	(18)	O	PG
(763699)			50		O	PG
			6500		H	PG
2-Ethyl Hexanol(104767)	600		600	(1)	O	G
2-Ethylanthraquinone(84515)	30		10		H	PG
Ethylene(74851)	160		40		V	TS
Ethylene Dichloride(10762)	1200		400		H	PG
Ethylene Glycol(107211)	-		-		O	-
			12700		H	TS
Ethylene Glycol Dinitrate	10		3		H	G
(628966)						
Ethylene Glycol Butyl Ether			2400		H	PG
(Butyl Cellosolve)(111762)	350		500	(18)	O	PG
Ethylene Glycol(1121712)			3250		H	PG
Butyl Ether Acetate	500		700	(18)	O	PG
(Butyl Cellosolve Acetate)						
Ethylene Glycol			380		H	PG
Ethyl Ether	800		1100	(18)	O	PG
(Cellosolve)(110805)						
Ethylene Glycol(111159)			540		H	PG
Ethyl Ether Acetate	220		300	(18)	O	PG
(Cellosolve Acetate)						
Ethylene Glycol Monohexyl	-		2500		H	PG
Ether(112254)			-		O	-
"R" Ethylene Oxide						
Ethylene Oxide(75218)	15		5		H	PG
Ethylenediaminetetra-	100		120		T	PG
acetic Acid(60004)						
Fentanyl Citrate(990738)	0.06		0.02		H	PG
Ferric Oxide(1309371)	75		25		S	S
Fluoridation t,GS			40	(4,15)	V	G
Fluoridation t,NM			80	(4,15)	V	G
Fluorides G,%%,GS(7664393)	4.3				V	S
			0.86		V	G
			0.34	(4)	V	G
Fluorides t, %%,GS	8.6				V	S
			1.72		V	G
			0.69	(4)	V	G
Fluorides t,%% NM	17.2				V	S
			3.44		V	G
			1.38	(4)	V	G
Fluorides in forage			80	(11,12)	A	G
Fluorides in forage			60	(11,13)	A	G
Fluorides in forage GS			35	(11,14)	A	G

Fluorinert 3M-FC-70	100		120		T	PG
Formaldehyde(50000)	65		65	(1)	O	S
Formic Acid(64186)	1500		500		H	S
Furfural(98011)	1000		1000	(1)	O	S
Furfuryl Alcohol(98000)	3000		1000		H	S
Gasoline(8006619)	-		-		O	-
Glutaraldehyde(111308)	42		14		H	PG
			35	(1)		
Haloperidol(52868)	0.3		0.1		H	PG
Hexachlorocyclopentadiene (77474)	6		2		H	PG
Hexamethyl Disilazane(999973)	5		2		H	PG
Hexamethylene Diisocyanate Monomer(822060)	1.5		0.5		H	PG
Hexamethylene Diisocyanate Trimer(4035896)	3		1		H	PG
Hexane(110543)	35000		12000		H	G
Hexylene Glycol(107415)	14400		12000		H	TS
Hydrogen Chloride(7647010)	100		40		C	S
Hydrogen Bromide(10035106)	800		668	(1)	H	TS
	-		-		O	TS
Hydrogen Cyanide(74908)	1150		575		H	S
Hydrogen Peroxide(7722841)	90		30		H	PG
Hydrogen Sulphide(7783064)	30		30	(1)	O	S
Isobutanol(78831)	1940		2640	(18)	O	PG
			655		O	PG
			15000	(1)	H	PG
Isobutyl Acetate(110190)	1220		1660	(18)	O	PG
			412		O	PG
			12700		H	PG
Isobutyl Isobutyrate(97858)	-		-		O	-
Isopropyl Acetate(108214)	1470		2000	(18)	O	PG
			500		O	PG
			19000		H	PG
Iron (Metallic)(15438310)	10		4		S	S
Isopropyl Alcohol(67630)	24000		24000		O	G
Isopropyl Benzene(98828)	100		100	(1)	O	PG
Lead(7439921)	10				H	S
			3	(4,5)	H	G
			2	(4,7)	H	G
			5	(8)	H	G
Lead in Dustfall	0.1	(3,4)	-		H	TS
Lindane (Hexachloro-cyclohexane)(58899)	15		5		H	PG
Lithium Hydrides(7580678)	7.5		2.5		H	S
Lithium (other than hydrides)	60		20		H	S
Manganese Compounds !!	30		10		H	PG
Magnesium Oxide(1309484)	100		120		T	S
Malathion(121755)	100		120		T	G
Maleic Anhydride(108316)	100		30		H	G
"R" Manganese						
Manganese(7439965)	7.5		2.5		H	TS
Mercaptans (as methyl mercaptan)(74931)	20		20	(1)	O	S
Mercapto benzo thiazo disulphide(120785)	100		120		T	G
Mercury (alkyl)	1.5		0.5		H	S
Mercury(7439976)	5		2		H	S
Metaldehyde(108623)	100		120		T	PG

		9000		H	PG
Methacrylic Acid(79414)	2000	2000		O	G
Methane diphenyl(101688) di-isocyanate (methylene bisphenyl isocyanate)	3	1		H	TS
Methoxychlor(72435)	100	120		T	G
5-methyl-2-hexanone(110123)	460	630	(18)	O	PG
		160		O	PG
		4600		H	PG
Methylal(109875)	18000	6200		H	PG
Methyl Acrylate(96333)	4	4	(1)	O	S
Methyl Alcohol(67561)	84000	28000		H	S
Methyl Bromide *	12000	4000		H	S
Methyl Bromide(74839)	4000	1350		H	G
Methyl Chloride(74873)	20000	7000		H	G
Methylcyclopentadienyl(12108133) Manganese Tricarbonyl (MMT)	30	10		H	S
Methyl mercapto aniline (2987533)	-	-		O	-
Methyl Ethyl Ketone (2-Butanone)(78933)	31000	31000	(1)	O	S
Methyl Ethyl Ketone Peroxide(1338234)	250	80		H	G
		200	(1)		G
Methyl Isobutyl Ketone(108101)	1200	1200		O	G
Methyl Methacrylate(80626)	860	860		O	S
Methyl-N-Amyl Ketone(110430)		4600		H	G
	-	-		O	-
Methyl Salicylate(119368)	300	100		H	G
4,4 Methylene-Bis-2-Chloroaniline(101144)	30	10		H	G
"R" Methylene Chloride					
Methylene Chloride(75092)	5300	1765		H	TS
Methylene Dianiline(107779)	30	10		H	G
Miconazole Nitrate	15	5		H	PG
Milk Powder	20	20		S,O	S
Mineral Spirit	30000	10000		H	IS
Molybdenum(7439987)	100	120		T	TS
Monochlorobenzene(108907)	4200	3500	(1)	H	TS
		4500	(18)	O	TS
Monomethyl Amine(74895)	25	25		O	S
Naphthalene(91203)	36	22.5		H	PG
		50	(18)	O	PG
Nickel(7440020)	5	2		V	S
Nickel Carbonyl(13463393)	1.5	.5		H	S
Nitric Acid(7697372)	100	35		C	S
Nitrilotriacetic Acid (18662538)	100	120		T	S
Nitroglycerin(55630)	10	3		H	G
Nitrogen Oxides (as NO2)(10102440)	500	200		H	S
		400	(1)		
Nitrous Oxide(10024972)	27000	9000		H	PG
N-Nitrosodiethylamine(55185)	-	-		H	CAR
N-Nitrosodimethylamine	-	-		H	CAR
Octane(111659)	45400	61800	(18)	O	PG
		15300		O	PG
		145000		H	PG
Oleic Acid(112801)	6	5	(1)	H	TS
Orthodichlorobenzene (95501)	37000	30500	(1)	H	TS
		-		O	TS

Octene-1(25377837)	150000		50000		H	PG
Oxalic Acid(144627)	75		25		H	PG
Ozone(10028156)	200		165	(1)	H,V	S
Paraquat Dichloride-1910425	9	(16)	3	(16)	H	IS
-res.						
-total in ambinet air	45	(16)	15	(16)	H	IS
Palladium (H2O sol.)## (7657101)	30		10		H	PG
Penicillin(1406059)	0.3		0.1		H	G
Pentaborane(19624227)	3		1		H	S
"R" Pentachlorophenol						
Pentachlorophenol(87865)	60		20		H	G
Perchloroethylene(127184)	10000		4000		H	G
Phenol(108952)	100		100		H	S
Phosgene(75445)	130		45		H	S
Phosphine(7803512)	30		10		H	PG
Phosphoric Acid(7664382) (as P2O5)	100		120		T	S
Phosphorus Pentachloride (10026138)	30		10		H	G
Phosphorus Oxychloride (10025873)	40		12		H	PG
Phthalic Anhydride(85449)	100		120		T	S
Pimozide(2062784)	3		1		H	PG
Platinum in water(7440064) soluble compounds %	0.6		0.2		H	G
Polybutene-1-Sulphone	100		120		T	PG
Polychlorinated(1336363)	450	16	150	(16)	H	G
Biphenyls (risk: .84/m)			35	(16,6,10)		G
Polychloroprene(25267156)	100		500		T	G
Potassium Cyanide @@(151508)	100		120		T	PG
Potassium Hydroxide(1310583)	28		14		C	PG
Potassium Nitrate(7757791)	100		120		T	G
Propionaldehyde(123386)	7		10	(18)	O	PG
			2.5			
Propionic Acid(79094)	100		100	(1)	O	G
Propionic Anhydride(123626) (exressed as propionic acid)	100		100	(1)	O	G
n-Propyl Alcohol(71238)	48000		16000		H	G
Propylene Dichloride(78875)	2400		2400		O	S
Propylene Glycol(57556)	100		120		H	PG
	-		-		O	-
Propylene Glycol Mono-methyl Ether Acetate (108656)	5000		5000		O	PG
Propylene Glycol Methyl Ether(107982)	89000		121000	(18)	O	PG
			30000		O	PG
"R" Propylene Oxide						
Propylene Oxide(75569)	13500		4500		H	PG
Pyridine(110861)			150		H	PG
	60		80	(18)	O	PG
n-methyl-2-pyrrolidone (872504)	-		40000	(1)	H	TS
	-		-		O	-
Selenium(7782492)	20		10		H	G
Silane(7803625)	450		150		H	PG
Silica-respirable (d<10 um)	15		5		H	G
Silver(7440224)	3		1		H	S
Sodium Bisulphite(7631905)	100		120		T	PG
Sodium Chlorate(7775099)	18		6		H	TS

Sodium Chlorite(7758192)	60	20	H	PG
Sodium Cyanide @@(143339)	100	120	T	PG
Sodium Hydroxide(1310732)	20	10	C	PG
Stannous Chloride (as Tin)	30	10	H	PG
Strontium(7440246)	100	120	T	TS
Strontium Oxide(1314110)	100	120	T	TS
Strontium Hydroxide (18480074)	100	120	T	TS
Strontium Carbonate (1633052)	100	120	T	TS
Styrene(100425)	400	400	O	S
Sulphamic Acid	100	120	T	TS
Sulphur Dioxide(7446095)	830	275	H,V	S
		690 (1)		S
		55 (6)		S
Sulphuric Acid(7664939)	100	35	C	S
Sulphur Hexafluoride (2551-62-4)	1.8 M	600000	H	TS
Suspended Particulate Matter (d<44 um)	100	120	VIS	S
		60 (6,7)		S
Talc (fibrous)(14807966)	5	2	H	G
Tellurium(13494809)except hydrogen telluride	30	10	H	S
Tetrabutylurea	30	10	H	PG
Tetrahydrofuran(109999)	93000	93000	O	S
Tetramethyl thiuram disulphide	30	10	H	G
Thiourea(62566)	60	20	H	PG
Tin(7440315)	30	10	H	S
Titanium(7440326)	100	120	T	S
Tolmetin Sodium	15	5	H	PG
Toluene(108883)	2000	2000	O	S
Toluene Di-isocyanate (584849)	1	0.5	H	S
Total Reduced Sulphur** (TRS) as equivalent H2S (from Kraft Pulp Mills)	40	40 (1)	O	PG
1,2,4-Trichlorobenzene** (120821)	100	400	T	G
1,1,1-Trichloroethane (methyl chloroform) (71556)	350000	115000	H	S
Trichloroethylene(79016)	85000	28000	H	S
Trichlorofluoromethane (75694) See Bill 218-CFC's	18000	6000	H	IS
Tifluorotrichloro Ethane(76131)	2.4M	800000	H	S
Trimethyl Amine(75503)	0.5	0.5 (1)	O	G
1,2,4-Trimethylbenzene (2551137)	500	1000	O,H	G
Trimethylol propane(77996)	100	1250	H	TS
Tripropyltin Methacrylate	3	1		G
Vanadium(7440622)	5	2	H	S
Vinyl Chloride(75014)*	560	280	H	G
Vinyl Chloride	3	1	H	IS
		0.2 (6)		
"R" Vinylidene Chloride (1,1-Dichloro Ethene)				

Vinylidene Chloride(75354)	70	35	H	PG
Warfarin(81812)	30	10	H	G
Whey Powder	100	120	T	PG
Xylenes(1330207)	2300	2300	O	S
Zinc(7440666)	100	120	T	S
Zinc Chloride(7646857)	12	10	H	IS

DEFINITIONS FOR ABBREVIATIONS IN LIST OF STANDARDS, INTERIM STANDARDS, TENTATIVE STANDARDS, GUIDELINES, AND PROVISIONAL GUIDELINES

A - Effects on Animals
C - Corrosion
CAR - Carcinogen with no assigned standard or guideline value. Emissions to the environment must be prevented or limited to the greatest extent possible.
G - Gaseous
H - Health
I - Irritant property
M - Million
O - Odour
P - Particulate
res. - Respirable Fraction
S - Soiling
VIS - Visibility
as - All Sources
ss - Single Source
t - Total
T - TSP (total suspended particulate) standard
V - Vegetation
W - Corrosivity of reaction product with water
X - SO2 activity
Z - High background levels from automobiles
> background - above prevailing ambient air levels
GS - Growing season
 May 1 - September 30 - NE & NW regions
 April 1 - September 30 - other regions
NM - October 1 - March 31
!! - Including Potassium Permanganate as Manganese
@ - ug/m2
@@ - As total salt
# - Total Asbestos
## - Water soluble forms including Palladium Chloride as Palladium
% - Including Hexachloroplatinic Acid as Platinum
%% - As HF
* - changed, lowest value in effect
** - under review, for details see Contact
1 - 1 hour
2 - 8 hour
3 - g/m2
4 - 30 day
5 - arithmetic mean
6 - 1 year
7 - geometric mean
8 - single sample
9 - fibres per cc, of length > 5um
10 - average
11 - ppm
12 - dry weight, any single month
13 - dry weight, average of 2 consecutive months
14 - dry weight, average of monthly results for growing season
15 - ug total fluorides/100 cm2 limed paper
16 - ng/m3
17 - pg/m3
18 - 10 minute
19 - mg SO3/100 cm2/day

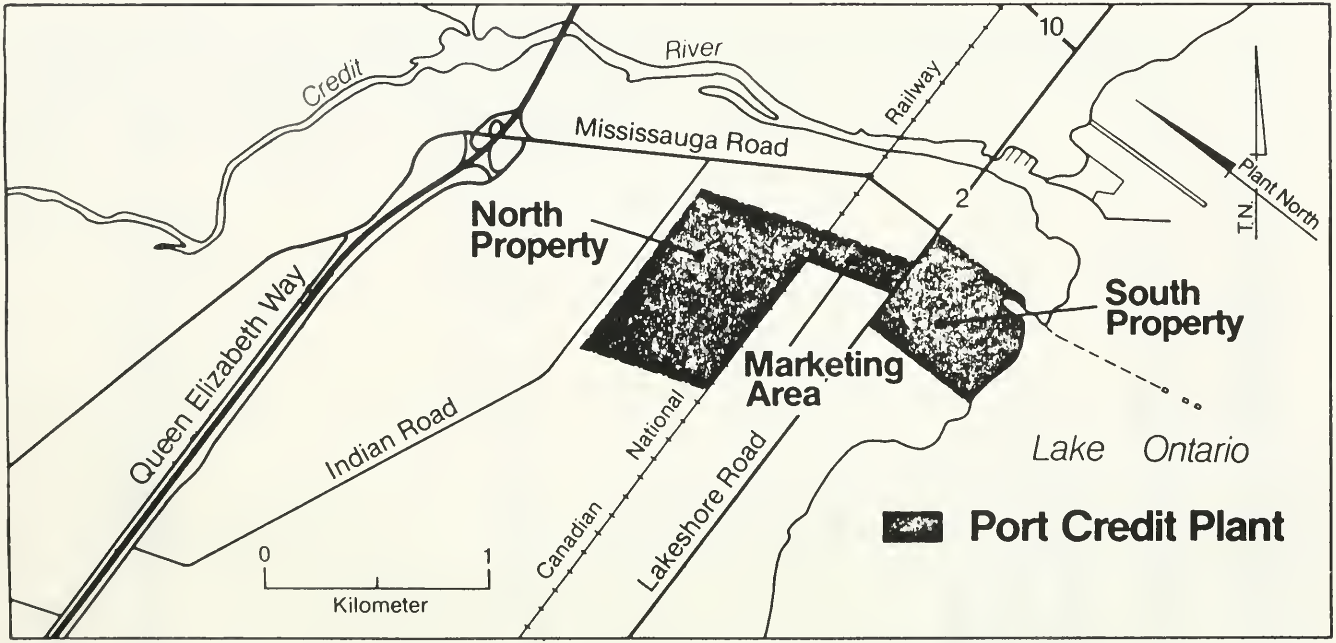
APPENDIX B

The Texaco Land Reclamation Study

- Area Map (Figure 2)
- Survey Periods and the Common Contaminants
- VOC Data

Figure 2

TEXACO LAND RECLAIMATION PROJECT
Port Credit, Ontario



Map Courtesy of Texaco Canada Inc.
T.N. : True North

Survey Periods - Texaco; 1989

Period	Monitoring Site	Date	Start	# Hrs.	
A272	Saddington Park	June 27	12:05	2.2	Dwnwd
A281	Saddington Park	June 28	11:49	3.5	Dwnwd
A291	125 High Street	June 29	10:33	4.0	Dwnwd
A301	Miss.Rd @ Port	June 30	10:11	2.7	Dwnwd

Common Contaminants

(Maximum Half-Hour Average Ground Level Concentrations)

Period	TRS	THC	CH_4	Wind Dir/Sp (Median)	Temp
A272	nd	1.7	1.2	200/07	31
A281	nd	1.5	1.4	310/15	27
A291	nd	2.2	1.2	355/06	25
A301	nd	2.0	1.4	160/09	23

Concentration units are **PPM** - Parts Per Million by volume.
Wind direction units are **degrees** from true north and wind speed units are **km/hr** - kilometres per hour.
Temperature units are **°C** - degrees Celsius.

Sample Identification	A26J_2	A262-1	A27J_1	A272-1	A272-2	A28J_1	A281-1	A28J_2
Sample Start Time	1328	1340	1200	1200	1321	1150	1151	1310
(Half-Hour Samples)	DW-M#1	DW-Lab	DW-M#1	DW-Lab	DW-Lab	DW-M#1	DW-Lab	DW-M#1
1 PROPANE	20	T	T	T	T	T	T	T
2 CHLOROETHENE								
3 BUTANE	317	38	108	26	T	13	T	T
4 PENTANE	58	10	24	8	T	7	T	T
5 DICHLOROMETHANE								
6 HEXANE	T	T	T	T		T		T
7 TRICHLOROMETHANE								
8 1,2-DICHLOROETHANE								
9 1,1,1-TRICHLOROETHANE	T		T					
10 BENZENE	14	7	16	32	6	T	9	T
11 TETRACHLOROMETHANE								
12 TRICHLOROETHENE								
13 HEPTANE	T		T					
14 TOLUENE	T	9	23	9	3	T	4	T
15 TETRACHLOROETHENE								
16 OCTANE	T		T					
17 CHLOROBENZENE				18	6			
18 ETHYLBENZENE	T		T			T		
19 M,P-XYLENE	T	6	T	7		T	T	T
20 STYRENE			T	T				
21 O-XYLENE	T	T	T	T		T		
22 1,1,2,2-TETRACHLOROETHANE								
23 NONANE								
24 1,2,4-TRIMETHYLBENZENE	T	T	T	T		T		
25 1,3-DICHLOROBENZENE								
26 DECANE								
27 1,2-DICHLOROBENZENE								
28 1,2-DIETHYLBENZENE								
29 UNDECANE	T					T		
30 1,2,4-TRICHLOROBENZENE								
31 NAPHTHALENE								
32 DODECANE	T		T			T		
33 TRIDECANE	T	T	6			5	T	
Number of VOCs Identified	16	10	16	11	6	13	7	7

Texaco 1989 Study
Refinery Decommissioning and Land Land Reclaimation

Sample Identification	A28J_3	A281-3	A29J_1	A29J_2	A291-2	A29J_3	A291-3	A30J_1	A30J_2
Sample Start Time	1415	1415	1039	1200	1200	1340	1340	1025	1145
(Half-Hour Samples)	DW-M#1	On-S-Lab	DW-M#1	DW-M#1	On-M-Lab	DW-M#1	On-N-Lab	DW-M#1	DW-M#1
1 PROPANE	T	T	T	T	T	T		T	T
2 CHLOROETHENE									
3 BUTANE	T		41	57	16	99	T	22	23
4 PENTANE	T		17	T	8	21	T	9	8
5 DICHLOROMETHANE									
6 HEXANE	T		T		T	T		T	T
7 TRICHLOROMETHANE									
8 1,2-DICHLOROETHANE									
9 1,1,1-TRICHLOROETHANE			T			T		T	T
10 BENZENE	T	3	7	T	5	T	2	7	T
11 TETRACHLOROMETHANE									
12 TRICHLOROETHENE								2	
13 HEPTANE								T	T
14 TOLUENE	T	T	T		6	T	T	T	T
15 TETRACHLOROETHENE									
16 OCTANE									
17 CHLOROBENZENE					7		14		
18 ETHYLBENZENE					T				
19 M,P-XYLENE	T				T				
20 STYRENE									
21 O-XYLENE			T						
22 1,1,2,2-TETRACHLOROETHANE									
23 NONANE									
24 1,2,4-TRIMETHYLBENZENE						T		T	T
25 1,3-DICHLOROBENZENE									
26 DECANE									
27 1,2-DICHLOROBENZENE									
28 1,2-DIETHYLBENZENE									
29 UNDECANE									
30 1,2,4-TRICHLOROBENZENE									
31 NAPHTHALENE									
32 DODECANE									
33 TRIDECANE									
Number of VOCs Identified	7	3	8	4	9	8	5	10	9

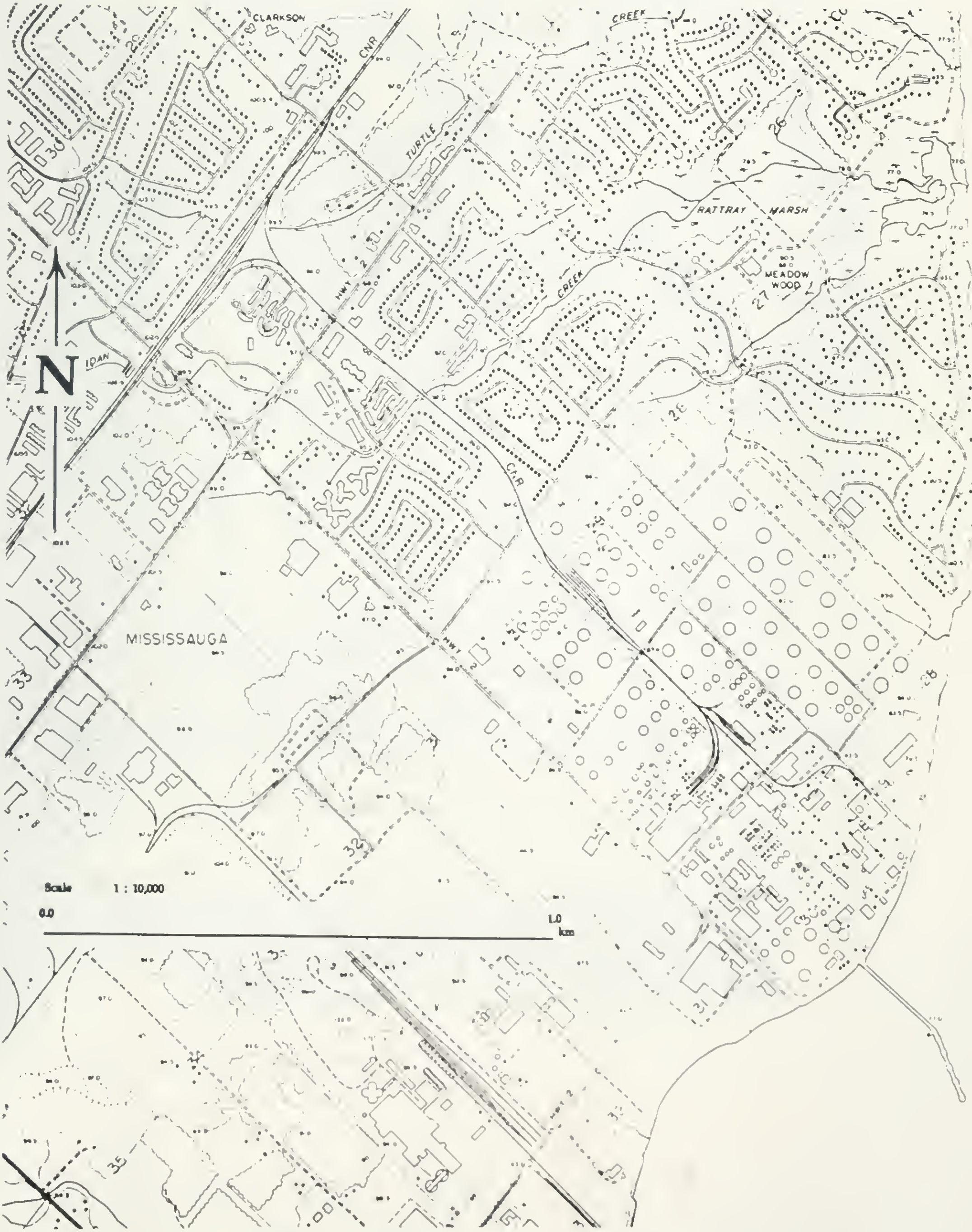
APPENDIX C

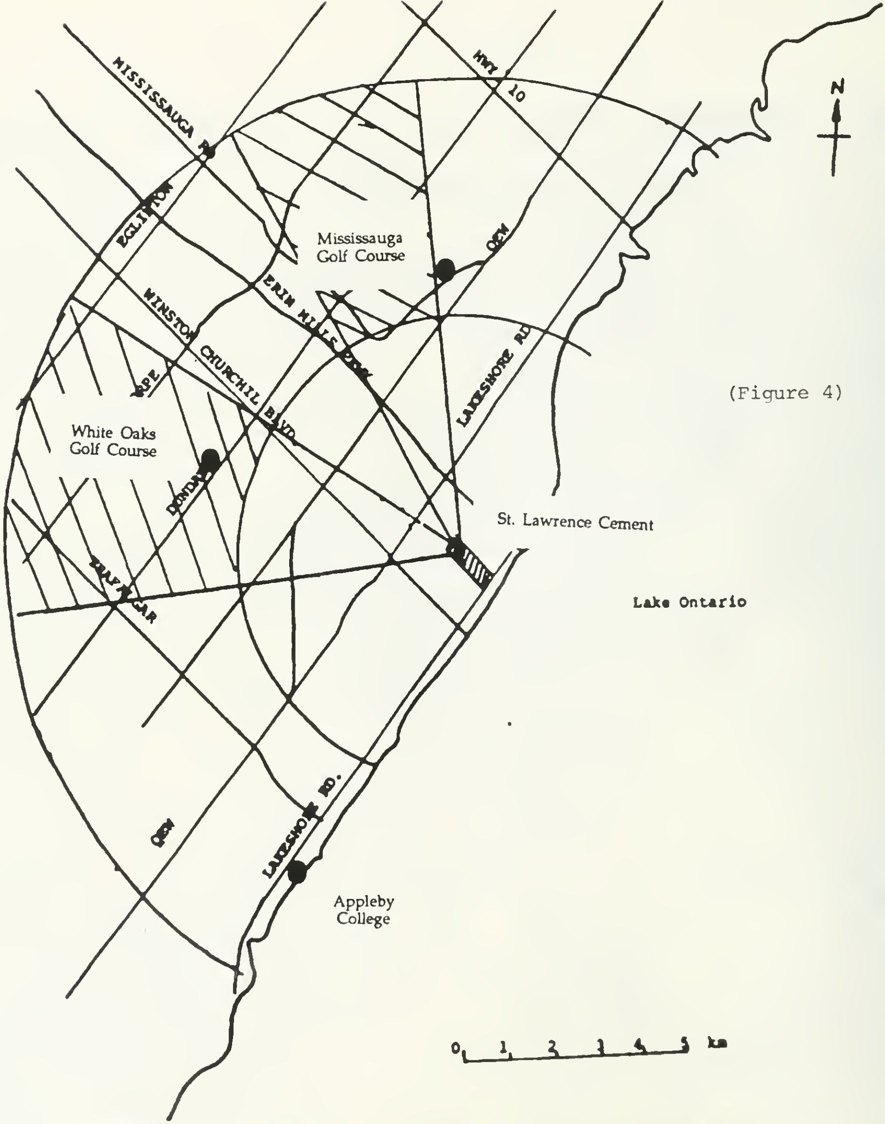
The Saint Lawrence Cement Study

- Area Map (Figure 3)
- Map of Fumigation Zones and Semi-Permanent Monitoring Sites (Figure 4)
- Survey Periods and the Common Contaminants
- VOC Data - Field Work (Mobile Unit's Samples)
- VOC Data - ARB Laboratory Work (Gilian Samples)
- PCBs, Chlorinated Compounds and CBs Data (LSB Results)
- PCDDs and PCDFs Data (LSB Results)

Figure 3

1989 - Meadow Wood and St. Lawrence Cement





(Figure 4)

Maximum concentration for the Kiln stack at St. Lawrence Cement Plant would frequently occur at 5 to 10 km downwind of the source in the summer. This map shows two sectors for which wind direction occur slightly more frequently. Monitors located in the shaded area are likely to capture the plume more effectively. Wind rose for the wind monitor at Evans Ave. in Etobicoke indicates that all wind directions from NE to SW occur with reasonable frequency.

Monitoring Sites

Monit.¨ Period	Date	Location	Start	Duration
A072	07/06	#4 Parking Lot @ Erindale College	13:50	2.2 hrs
A081	08/06	Burnhamthorpe & Central Parkway	11:41	3.6
A121	12/06	Burnhamthorpe & Central Parkway	10:44	4.1
A142	14/06	White Oaks Golf Course	12:25	1.2
A143	14/06	Golf Centre @ Dundas & 4th	13:53	0.6

The Common Contaminants and Weather

Monit.¨ Period	CO	THC	NOx	SO_2	W.Di.	W.Sp.	Temp.	Weather
A072	1.1	1.6	0.03	nd	SE	10	27	Sunny - TIBL
A081	1.1	1.4	0.03	nd	SE	10	27	Sunny - TIBL
A121	1.1	1.8	0.04	nd	SE	15	22	Sunny - TIBL
A142	0.4	n/a	0.02	nd	NE	30	15	Mainly Cloudy
A143	0.7	n/a	0.03	nd	E	40	17	Mainly Cloudy

The above concentrations are in ppm (parts per million) and are the maximum half-hour average concentrations measured during the specified monitoring periods.

n/a : not available nd : not detected

TIBL : Thermal Induced Boundary Layer

The detection limit for SO_2 was 0.01 ppm.

¨ Each monitoring period is designated as Axxy where xx is the date in June and y is the monitoring period of the day. For example, A072 refers to the 2nd monitoring period of June 7th.

The Volatile Organic Compounds as Determined by MAMU"1 in the Field

(The St. Lawrence Cement Study - 1989)

Sample I.D."	V071	V072	V081	V082	V083	V121	V122	V123	V141	V142
propane	32	7	-	-	-	7	3	4	2	12
chloroethane	-	-	-	-	-	-	-	-	-	-
butane	111	26	177	42	38	8	T	T	13	28
pentane	24	7	40	10	8	T	T	T	5	8
dichloromethane	-	-	-	-	-	-	-	-	-	-
hexane	8	4	20	7	6	3	3	T	3	5
trichloromethane	-	-	-	-	-	-	-	-	-	-
1,2-dichloroethane	-	-	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	T	T	T	T	T	T	-	-	-	-
benzene	7	5	19	14	9	4	T	T	4	6
tetrachloromethane	-	-	-	-	-	-	-	-	-	-
trichloroethene	-	-	-	-	-	-	-	-	-	-
heptane	T	T	6	T	T	T	-	-	T	T
toluene	17	13	38	18	13	T	T	T	T	12
tetrachloroethene	-	-	-	-	-	-	-	-	-	-
octane	2	T	4	2	-	-	-	-	T	T
chlorobenzene	-	-	-	T	-	-	-	-	-	-
ethylbenzene	T	T	9	T	T	T	T	T	T	T
m,p-xylene	-	-	30	15	10	T	T	T	T	T
styrene	-	-	-	-	-	-	-	-	-	-
o-xylene	-	-	-	-	-	-	-	-	-	-
1,1,2,2-tetrachloroethane	-	-	-	-	-	-	-	-	-	-
nonane	T	T	4	T	-	T	-	-	T	T
1,2,4-trimethylbenzene	-	-	28	-	-	-	-	-	-	-
1,3-dichlorobenzene	-	-	-	-	-	-	-	-	-	-
decane	-	-	-	-	-	-	-	-	-	-
1,2-dichlorobenzene	-	-	-	-	-	-	-	-	-	-
1,2-diethylbenzene	-	-	-	-	-	-	-	-	-	-
undecane	-	-	-	T	T	-	-	-	-	-
1,2,4-trichlorobenzene	-	-	-	-	-	-	-	-	-	-
naphthalene	-	-	-	-	-	-	-	-	-	-

The concentration units for the above are ug/m^3 (micrograms per cubic metre) and each saw a half-hour sample.

" Each VOC sample is denoted as Viij where ii refers to the date in June and j refers to the sample acquired during that day.

"T" Refers to a concentration that was greater than the Minimal Detectable Limit but less than the Minimal Quantitation Limit.

"-" Refers to being "Not Detected".

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St. Lawrence Cement Survey: Lab Analyses
SAVED FILE: C:\SYMPHONY\GC89DATA\STLWGCF.WR1

Sample Identification	#1	#2	#1	#1	#1A	
	June 6	June 8	June 8	June 12	June 14	June 14
Sample Start Time	1353	1455	1142	1153	1354	1354
(Half-Hour Samples)	Erindale College Parking Lot #4		Central Parkway	Plaza	Miss. Golf Course	
	DW	DW		DW		
1 PROPANE	T				T	T
2 CHLOROETHENE						
3 BUTANE	43	T	T		T	T
4 PENTANE	11	T	T	T	T	T
5 DICHLOROMETHANE						
6 HEXANE						
7 TRICHLOROMETHANE						
8 1,2-DICHLOROETHANE						
9 1,1,1-TRICHLOROETHANE						
10 BENZENE	3	T	2	15	T	T
11 TETRACHLOROMETHANE						
12 TRICHLOROETHENE						
13 HEPTANE						
14 TOLUENE	5	T	T	T	T	T
15 OCTANE						
16 TETRACHLOROETHENE						
17 CHLOROBENZENE	T	T		8	T	
18 ETHYLBENZENE						
19 m,p-XYLENE	T	T	T		T	
20 STYRENE						
21 1,1,2,2-TETRACHLOROETHANE						
22 o-XYLENE						
23 NONANE						
24 1,2,4-TRIMETHYLBENZENE						
25 1,3-DICHLOROBENZENE						
26 DECANE						
27 1,2-DICHLOROBENZENE						
28 1,2-DIETHYLBENZENE						
29 UNDECANE						
30 1,2,4-TRICHLOROBENZENE						
31 NAPHTHALENE						
32 DODECANE						
33 TRIDECANE				T		
Total Compounds Identified	7	6	5	5	7	5

PCBs, CHLORINATED COMPOUNDS and CBs

(The St. Lawrence Cement Study - 1989)

Sample I.D."	Location	Total PCBs	Total CBs
PCB 071	Appleby College	nd	nd
PCB 072	White Oaks Golf	0.3 (hexa-)	nd
PCB 073	Mississauga Golf	nd	nd
PCB 081	Appleby College	nd	nd
PCB 082	White Oaks Golf	1.0 (tetra, penta & hepta-)	1.0 (penta-)
PCB 083	Mississauga Golf	0.3 (tri & tetra-)	nd
PCB 121	Appleby College	nd	nd
PCB 122	White Oaks Golf	nd	nd
PCB 123	Mississauga Golf	nd	nd
PCB 141	Appleby College	0.9 (tetra, octa & nona-)	nd
PCB 142	White Oaks Golf	nd	nd
PCB 143	Mississauga Golf	nd	nd

Concentration units are ng/m^3 (nanograms/cubic metre) and each was a 24-hour sample.
The detection limit for total PCBs is 0.2 ng/m^3 and is based on 82 different isomers.
nd refers to compound being not detected.

" Each sample is denoted as "PCB **aab**" where **aa** is the date in June and **b** is the sample number. Chlorinated compounds and CBs are entered together as Total CBs.

Dioxin and Furan Results - 1989 St. Lawrence Cement Survey

(PCDD - Polychlorinated Dibenzo-P-Dioxins)
(PCDF - Polychlorinated Dibenzofurans)

	1st Sample Set (June 7 - 9)			RTFs*	2nd Sample Set (June 12 - 14)		
	MGC#1	MGC#2	Appleby		MGC#1	MGC#2	Appleby
4CDD	0.16	0.18	0.07	(1.0)	0.12	0.14	0.08
5CDD	0.05	0.04	0.02	(0.1)	0.09	0.07	0.04
6CDD	0.05	0.09	0.06	(0.1)	0.10	0.14	0.12
7CDD	0.10	0.11	0.09	(0.01)	0.15	0.15	0.08
8CDD	0.20	0.16	0.14	(0.0001)	0.28	0.31	0.13
For the Dioxins:							
TEQs**	**0.17**	**0.19**	**0.08**		**0.14**	**0.16**	**0.10**
4CDF	0.65	0.74	0.35	(0.5)	0.58	0.64	0.42
5CDF	0.11	0.10	0.06	(0.5)	0.16	0.17	0.09
6CDF	0.08	0.11	0.05	(0.1)	0.12	0.11	0.11
7CDF	0.07	0.10	0.05	(0.01)	0.12	0.13	0.04
8CDF	0.04	0.04	0.03	(0.0001)	0.06	0.08	0.04
For the Furans:							
TEQs**	**0.39**	**0.43**	**0.21**		**0.38**	**0.42**	**0.27**
For both the Dioxins and Furans:							
TEQ	**0.56**	**0.62**	**0.29**		**0.52**	**0.58**	**0.37**

Units are pg/m^3 (picograms per cubic metre)   MGC - Mississauga Golf Course

* RTFs - Relative Toxicity Factors of PCDD and PCDF isomer groups to 2,3,7,8-T_4CDD from Table 3.6.7c of Ministry Publication:

Scientific Criteria Document
for Standard Development
(No. 4 - 84); September 1985

** TEQs - Toxic Equivalents
- Since no specific isomer concentration is known, assume the worse case condition
ie. the only 4CDD isomer detected was 2,3,7,8-T_4CDD
TEQ = (RTF) X (isomer group concentration)

An interim guideline for PCDD and PCDF (in air) is:
5pg TEQ / cubic metre as a one-year average concentration.

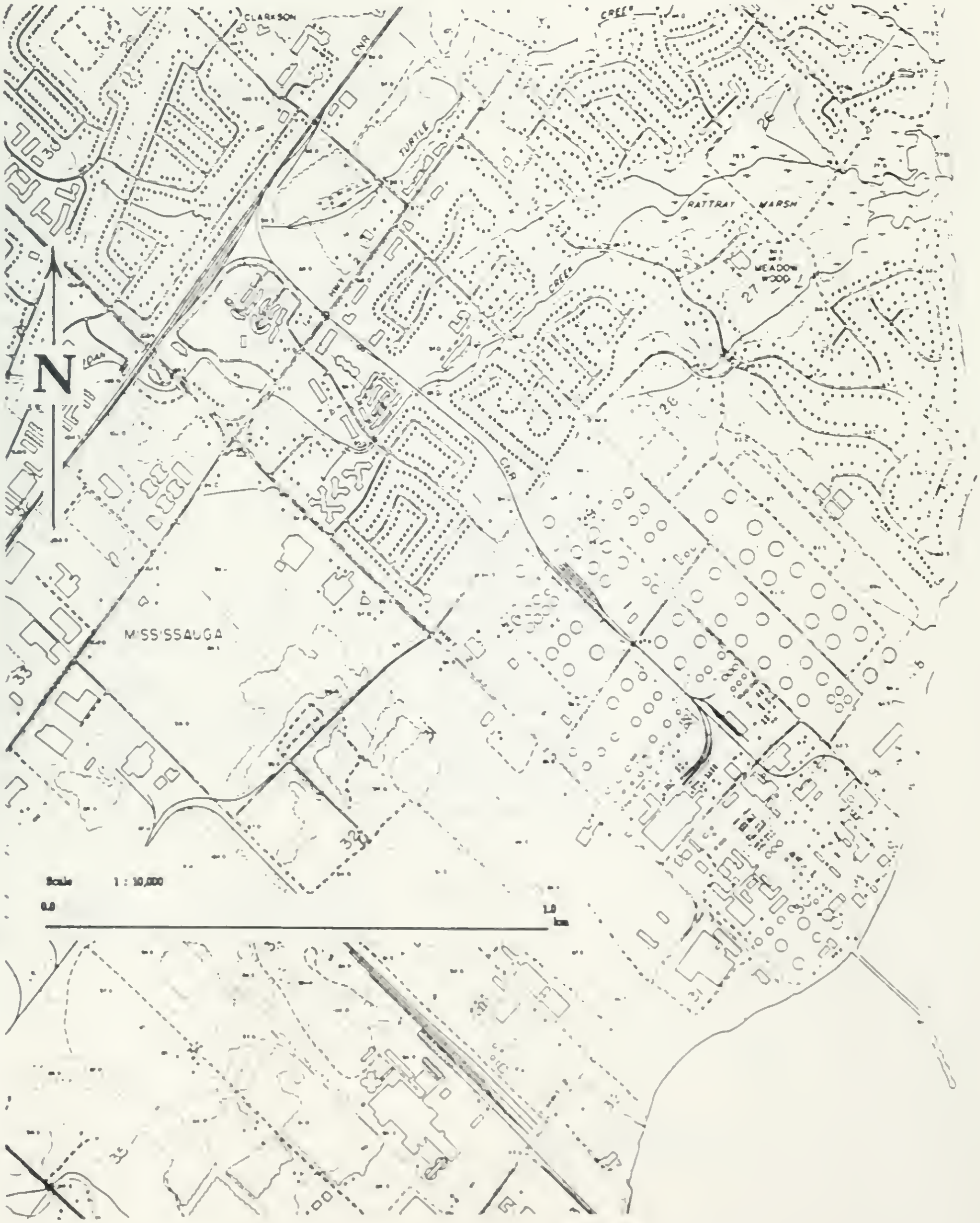
APPENDIX D

The Petro-Canada Study (Meadow Wood)

- Area Map (Figure 5)
- Monitoring Periods and Locations
- The Common Contaminants
- VOC Sampling Sites
- VOC Data - Field Work (Mobile Unit's Samples)
- VOC Data - ARB Laboratory Work (Gilian Samples)
- PCBs, Chlorinated Compounds and CBs Data (LSB Results)
- PCDDs and PCDFs Data (LSB Results)

Figure 5

1989 - Meadow Wood and St. Lawrence Cement



Meadow Wood 1989 Study

Monitoring Periods, Locations and Durations

Period	Location		Duration (hrs)
A182	1662 Stonehaven Drive	(DW)	1.7
A183	Clarkson Sewage Trestment Plant	(ON)	19.0
A192	Clarkson Sewage Treatment Plant	(DW)	1.6
A193	Clarkson Sewage Treatment Plant	(ON)	17.7
A202	Inverhouse Dr. & Orr Road	(DW)	1.9
A203	Bradley Museum	(DW)	1.9
A204	Clarkson Sewage Treatment Plant	(ON)	18.4
A212	Embassy Ave @ Bradley Park	(DW)	1.5
A213	1654 Stonehaven Drive	(UW)	1.1
A214	Clarkson Sewage Treatment Plant	(ON)	17.6
A222	1654 Stonehaven Drive	(DW)	2.5
A252	Bradley Museum	(DW)	2.4
A253	1654 Stonehaven Drive	(DW)	1.6
A254	Clarkson Sewage Treatment Plant	(ON)	17.1
A261	Clarkson Sewage Treatment Plant	(ON)	22.4
A272	Bradley Museum	(DW)	1.4
A273	1654 Stonehaven Drive	(DW)	1.5
A274	Clarkson Sewage Treatment Plant	(ON)	18.4
A282	Embassy Avenue @ Bradley Park	(UW)	1.6
A283	Bradley Museum	(DW)	1.6
A284	Clarkson Sewage Treatment Plant	(ON)	18.3
A291	1654 Stonehaven Drive	(UP)	1.5

Total # Hours:	(ON) Overnight:	(8 Periods)	148.9
	(UW) Upwind:	(3 Periods)	4.2
	(DW) Downwind:	(11 Periods)	19.6
	Grand Total		172.7

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1989 Air Quality Survey; Meadowwood

Common contaminants
(Maximum One-hour Average Ground-level Concentrations)

Monitoring Period	CO	TRS	THC	SO2	THC-M	CH4	NOx	NO2	NO	O3	Wind Speed/Direction (Median)	Temperature (Median)
A182	1.1	na	na	nd	na	na	na	na	na	0.06	5-10/Southerly	22
A183	1.9	na	na	nd	na	na	0.25	0.08	0.18	0.07	Light/Northwesterly	14
A192	0.4	na	na	nd	na	na	na	na	na	0.04	10-20/Easterly	22
A193	1.3	na	1.9	nd	0.8	1.2	0.13	0.04	0.09	0.05	10-20/Easterly	18
A202	0.8	na	1.8	nd	0.8	1.0	0.05	0.03	0.02	0.04	5-10/Southerly	25
A203	1.1	0.04	2.1	nd	1.0	1.1	0.07	0.04	0.02	0.04	Light/Southerly	25
A204	2.9	na	3.3	nd	2.0	2.0	0.31	0.09	0.25	0.06	Light/Southerly	14
A212	0.4	na	na	nd	na	na	na	na	na	0.05	Light/Southeasterly	24
A213	1.3	na	na	nd	na	na	na	na	na	0.05	5-10/Easterly	23
A214	0.6	na	na	nd	na	na	na	na	na	0.07	10-20/Easterly	20
A222	0.2	na	na	nd	na	na	na	na	na	0.03	Light/Southwesterly	26
A252	1.4	na	na	nd	na	na	na	na	na	0.03	10-20/Southerly	23
A253	0.1	na	na	nd	na	na	na	na	na	0.03	10-20/Southerly	21
A254	0.5	nd	na	nd	na	na	na	na	na	0.04	10-20/Northwesterly	12
A261	1.2	nd	na	nd	na	na	na	na	na	0.03	10-20/Northwesterly	07
A272	1.1	na	na	nd	na	na	0.09	0.04	0.06	0.02	Light/Southeasterly	16
A273	0.5	na	na	0.03	na	na	0.06	0.03	0.03	0.03	Light/Southerly	15
A274	1.5	nd	na	0.02	na	na	0.23	0.07	0.18	0.04	5-10/Southerly	07
A282	0.2	nd	na	nd	na	na	na	na	na	0.04	5-10/Southwesterly	20
A283	0.9	nd	na	nd	nd	na	na	na	na	0.05	5-10/Southwesterly	24
A284	0.5	nd	na	0.02	na	na	na	na	na	0.06	10-20/Southwesterly	15
A291	0.3	nd	na	nd	na	na	na	na	na	0.04	10-20/Northwesterly	22

Concentration units are PPM; Parts Per Million by volume
Wind speed units are km/hr; Kilometres per hour
Temperature units are degrees Celsius

MAMU#1's VOC SAMPLING - Meadow Wood 1989 Study

Date	Sample ID	Location	Comments
18/09	A18S_1	1654 Stonehaven	CG[1], Downwind
19/09	A19S_1	Sewage Treatment Plant	Upwind
20/09	A20S_1	Inverhouse & Orr Road	CG, Downwind, Odour
	A20S_2	Bradley Museum	CG, Downwind, Odour
21/09	A21S_1	Embassy Ave @ Bradley Park	CG, Downwind, Odour
	A21S_2	1654 Stonehaven	CG, Upwind
22/09	A22S_1	1654 Stonehaven	CG, Downwind
	A22S_2	1654 Stonehaven	Downwind
25/09	A25S_1	Bradley Museum	CG, Downwind
	A25S_2	1654 Stonehaven	CG, Downwind
27/09	A27S_1	1654 Stonehaven	CG, Downwind
28/09	A28S_1	Embassy Ave @ Bradley Park	CG, Upwind
	A28S_2	Bradley Museum	Downwind
29/09	A29S_1	1654 Stonehaven	CG, Upwind

[1] CG - Concurrent with Gilian VOC Sample

Gilian VOC Samples (ARB Lab Analyses)

18/09	A181-A	1654 Stonehaven	Downwind
	A182-A	1654 Stonehaven	Downwind
19/09	A191-A	1654 Stonehaven	Downwind
20/09	A202-A	Inverhouse & Orr Road	Downwind
	A202-B	Bradley Museum	Downwind
21/09	A211-A	Embassy Ave @ Bradley Park	Downwind
	A212-A	1654 Stonehaven	Upwind
22/09	A221-A	1654 Stonehaven	Downwind
25/09	A251-A	Bradley Museum	Downwind
	A252-A	1654 Stonehaven	Downwind
	A252-B	1654 Stonehaven	Downwind
26/09	A261-A	1654 Stonehaven	Upwind
27/09	A271-A	Bradley Museum	Downwind
	A272-A	1654 Stonehaven	Downwind
28/09	A281-A	Embassy Ave @ Bradley Park	Upwind
29/09	A291-A	1654 Stonehaven	Upwind

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Meadow Wood Survey: Sept 89 - MM#1 RESULTS
SAVED FILE: C:\SYMPHONY\MWOOD_89

Sample Identification	A18S_1	A19S_1	A20S_1	A20S_2	A21S_1	A21S_2	A22S_1	A22S_2
Sample Start Time (One-Hour Samples)	1339	1314	1120	1324	1229	1427	1127	1301
1 PROPANE	T	16	17	88	42	T	11	11
2 CHLOROETHENE								
3 BUTANE	14	T	54	187	61	86	20	46
4 PENTANE	8	T	14	70	52	24	11	8
5 DICHLOROMETHANE		T	T			T	T	T
6 HEXANE	T	T	T	34	24	T	T	T
7 TRICHLOROMETHANE								
8 1,2-DICHLOROETHANE								
9 1,1,1-TRICHLOROETHANE	T		T	T			T	
10 BENZENE	T	T	T	21	12	10	T	T
11 TETRACHLOROMETHANE								
12 TRICHLOROETHENE								
13 HEPTANE			T	T	T		T	
14 TOLUENE	T	T	T	34	23	T	T	T
15 TETRACHLOROETHENE								
16 OCTANE		T	T	T	T			
17 CHLOROBENZENE								
18 ETHYLBENZENE	T	T		T	T	T	T	T
19 M,P-XYLENE	T	T	T	T	T	T	T	T
20 STYRENE								
21 o-XYLENE	T					T		
22 1,1,2,2-TETRACHLOROETHANE								
23 NONANE				T	T			
24 1,2,4-TRIMETHYLBENZENE								
25 1,3-DICHLOROBENZENE								
26 DECANE								
27 1,2-DICHLOROBENZENE								
28 1,2-DIETHYLBENZENE								
29 UNDECANE			T	T	T			
30 1,2,4-TRICHLOROBENZENE								
31 NAPHTHALENE								
32 DODECANE	T		T	T				
33 TRIDECANE	T		T	T			T	
Total Compounds Identified	12	10	14	15	12	10	12	9

Meadow Wood Survey: Sept 89
SAVED FILE: C:\SYMPHONY\MWOOD

Sample Identification	A25S_1	A25S_2	A27S_1	A28S_1	A28S_2	A29S_1
Sample Start Time (One-Hour Samples)	1126	1405	1333	1130	1327	1052
1 PROPANE	22	18	50	T	13	T
2 CHLOROETHENE						
3 BUTANE	48	23	28	16	59	22
4 PENTANE	84	10	13	8	30	12
5 DICHLOROMETHANE		T	T	T		
6 HEXANE	27	T	T	T	T	T
7 TRICHLOROMETHANE						
8 1,2-DICHLOROETHANE						
9 1,1,1-TRICHLOROETHANE			T			T
10 BENZENE	T	T	T	T	9	T
11 TETRACHLOROMETHANE						
12 TRICHLOROETHENE						
13 HEPTANE	T		T		T	
14 TOLUENE	25	T	21	T	T	T
15 TETRACHLOROETHENE						
16 OCTANE	T		T		T	
17 CHLOROBENZENE						
18 ETHYLBENZENE		T	T	T	T	T
19 M,P-XYLENE		T	T	T	T	T
20 STYRENE						
21 o-XYLENE			T	T	T	T
22 1,1,2,2-TETRACHLOROETHANE						
23 NONANE			T			
24 1,2,4-TRIMETHYLBENZENE						T
25 1,3-DICHLOROBENZENE						
26 DECANE						
27 1,2-DICHLOROBENZENE						
28 1,2-DIETHYLBENZENE						
29 UNDECANE	T		T	T		
30 1,2,4-TRICHLOROBENZENE						
31 NAPHTHALENE						
32 DODECANE			T	T		
33 TRIDECANE			T	T	T	
Total Compounds Identified	9	9	17	13	12	12

Meadow Wood Survey: September 1989 - ARB Lab Analyses
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Sample Identification	A181-A	A182-A	A191-A	A202-A	A202-B	A211-A	A212-A	A221-A
Sample Start Time (One-Hour Samples)	1317	1419	1216	1120	1324	1229	1427	1137
				Dwnwd	Dwnwd	Dwnwd		Dwnwd
1 PROPANE	T	T	T	13	62	27	T	T
2 CHLOROETHENE								
3 BUTANE	T	T	T	26	76	38	21	12
4 PENTANE		T		9	40	46	T	T
5 DICHLOROMETHANE								
6 HEXANE		T		T	23	20		
7 TRICHLOROMETHANE								
8 1,2-DICHLOROETHANE								
9 1,1,1-TRICHLOROETHANE	T	T	T	T	T	T	T	
10 BENZENE	T	T	T	3	9	6	3	2
11 TETRACHLOROMETHANE					26	18		
12 TRICHLOROETHENE								
13 HEPTANE				T	T	T		
14 TOLUENE	T	T	T	14	21	14	5	5
15 TETRACHLOROETHENE					T			
16 OCTANE								
17 CHLOROBENZENE								
18 ETHYLBENZENE				T	T	T		
19 M,P-XYLENE				T	10	T	T	T
20 STYRENE								
21 o-XYLENE								
22 1,1,2,2-TETRACHLOROETHANE								
23 NONANE					T			
24 1,2,4-TRIMETHYLBENZENE								
25 1,3-DICHLOROBENZENE								
26 DECANE								
27 1,2-DICHLOROBENZENE								
28 1,2-DIETHYLBENZENE								
29 UNDECANE								
30 1,2,4-TRICHLOROBENZENE								
31 NAPHTHALENE								
32 DODECANE								
33 TRIDECANE								
Total Compounds Identified	5	7	5	10	13	11	7	6

Meadow Wood Survey: September 1989
SAVED FILE: C:\SYMPHONY\MDWOOD\LAB

	Sample Identification	A251-A	A252-A	A252-B	A261-A	A271-A	A272-A	A281-A	A291-A
	Sample Start Time (One-Hour Samples)	1126	1237	1339	1150	1145	1333	1130	1052
		Dwnwd	Dwnwd	Dwnwd	Upwd	Dwnwd	Dwnwd	Upwd	Upwd
1	PROPANE	18	T	13		34	23	T	T
2	CHLOROETHENE								
3	BUTANE	26	T	T	T	17	14	T	T
4	PENTANE	64	T	T	8	9	9		T
5	DICHLOROMETHANE				T				
6	HEXANE	20		T	T	T	T		
7	TRICHLOROMETHANE								
8	1,2-DICHLOROETHANE								
9	1,1,1-TRICHLOROETHANE	T			7	T	T	T	T
10	BENZENE	4	T	T	4	5	12	T	T
11	TETRACHLOROMETHANE				T	T	T		
12	TRICHLOROETHENE								
13	HEPTANE				T				
14	TOLUENE	7	T	6	47	18	15	5	T
15	TETRACHLOROETHENE								
16	OCTANE								
17	CHLOROBENZENE	T					T		
18	ETHYLBENZENE				14	T	T		
19	M,P-XYLENE	T	T	T	41	11	8	T	
20	STYRENE								
21	o-XYLENE								
22	1,1,2,2-TETRACHLOROETHANE								
23	NONANE								
24	1,2,4-TRIMETHYLBENZENE								
25	1,3-DICHLOROBENZENE								
26	DECANE								
27	1,2-DICHLOROBENZENE								
28	1,2-DIETHYLBENZENE								
29	UNDECANE								
30	1,2,4-TRICHLOROBENZENE								
31	NAPHTHALENE								
32	DODECANE								
33	TRIDECANE								
	Total Compounds Identified	9	6	7	11	10	11	6	6

PCBs, CHLORINATED COMPOUNDS and CBs
(Petro-Canada Study - Meadow Wood Area)

Filter #	Date	Location	Total PCBs[1]	Total CBs[2]
001	18/09	1653 Stonehaven	<1.0<W	<1.0<W
002	18/09	Bradley Museum	<1.0<W	<1.0<W
004	19/09	1653 Stonehaven	<1.0<W	<1.0<W
005	19/09	Bradley Museum	<1.0<W	<1.0<W
006	20/09	1653 Stonehaven	<1.0<W	<1.0<W
007	20/09	Bradley Museum	<1.0<W	<1.0<W
009	21/09	1653 Stonehaven	<1.0<W	<1.0<W
010	21/09	Bradley Museum	<1.0<W	<1.0<W
012	25/09	1653 Stonehaven	<1.0<W	<1.0<W
013	25/09	Bradley Museum	<1.0<W	<1.0<W
015	27/09	Bradley Museum	<1.0<W	<1.0<W
016	27/09	1653 Stonehaven	<1.0<W	<1.0<W
018	28/09	Bradley Museum	<1.0<W	<1.0<W
019	28/09	1653 Stonehaven	<1.0<W	<1.0<W

[1] Total PCBs refer to analyses for 82 different isomers.

[2] Chlorinated compounds and CBs are entered together as Total CBs.

All samples were exposed for 24 hours.
Concentration units are nanograms per cubic metre (ng/m3).
<1.0<W refers to organic compound being non detectable.

C:\WP50\SURVEYS\MWDPCBS/TBL

Dioxin and Furan Results - 1989 Meadow Wood Survey

(PCDD - Polychlorinated Dibenzo-P-Dioxins)
(PCDF - Polychlorinated Dibenzofurans)

	Sept 18	Sept 20	Sept 28	RFTs[*]
4CDD	0.4	0.3	0.1	(1.0)
5CDD	0.1	0.09	0.1	(0.1)
6CDD	0.8	0.5	0.3	(0.1)
7CDD	0.4	0.2	0.3	(0.01)
8CDD	0.5	0.4	0.5	(0.0001)
For the Dioxins:				
TEQs[**]	**0.49**	**0.36**	**0.14**	
4CDF	1.6	1.6	0.6	(0.5)
5CDF	0.5	0.2	0.2	(0.5)
6CDF	1.3	0.5	0.2	(0.1)
7CDF	0.8	0.3	-	(0.01)
8CDF	0.4	0.1	0.08	(0.0001)
For the Furans:				
TEQs[**]	**1.19**	**0.95**	**0.42**	
For **both** the Dioxins and Furans:				
TEQ	**1.68**	**1.31**	**0.56**	

Units are pg/m^3 (picograms per cubic metre)

[*] RTFs - Relative Toxicity Factors of PCDD and PCDF isomer groups to 2,3,7,8-T$_4$CDD from Table 3.6.7c of Ministry Publication:

Scientific Criteria Document
for Standard Development
(No. 4 - 84); September 1985

[**] TEQs - Toxic Equivalents
- Since no specific isomer concentration is known, assume the worse case condition
ie. the only 4CDD isomer detected was 2,3,7,8-T$_4$CDD
TEQ = (RTF) X (isomer group concentration)

An interim guideline for PCDD and PCDF (in air) is:
5pg TEQ / cubic metre as a one-year average concentration.

APPENDIX E

Industries in the Clarkson Area

INDUSTRIES IN THE CLARKSON AREA

COMPANY	SMOKE	ODOUR	AEROSOLS	SULFUR OXIDES	HYDROGEN SULFIDE	HYDROCARBON VAPOURS	CHLORINATED HYDROCARBON VAPOURS	SOLVENT VAPOURS	AMINES	PHENOLS
ALLWASTE TANK CLEANING 474 SOUTHDOWN RD., MIS MISSISSAUGA STEAM-CLEANED TANKS		X	X			X	X	X		
ASHLAND CHEMICALS 2620 ROYAL WINDSOR DR., MISSISSAUGA PHENOLIC RESINS, SOLV, IND. CHEM.		X		X		X		X		
CLARKSON WPCP 2307 LAKESHORE RD., MISSISSAUGA TREATED WASTE WATER		X	X							
DIVERSEY-WIANDOTTE INC. 2645 ROYAL WINDSOR DR., MISSISSAUGA DETERGENTS, SANITIZERS		X	X			X			X	
FORD MOTOR COMPANY OF CANADA CANADIAN ROAD, OAKVILLE CARS & TRUCKS	X	X	X	X		X		X		
H.L. BLACHORD LIMITED 2323 ROYAL WINDSOR DR., MISSISSAUGA LUBRICANTS		X			X	X		X		
KENOX C/O UNIVERSAL DRUM RECOND. LTD. 2460 ROYAL WINDSOR DR., MISSISSAUGA TREATED WASTE WATER FROM UNIV. DRUM		X				X	X - PCB's PCDDs PCDFs	X		

INDUSTRIES IN THE CLARKSON AREA

COMPANY	SMOKE	ODOUR	AEROSOLS	SULFUR OXIDES	HYDROGEN SULFIDE	HYDROCARBON VAPOURS	CHLORINATED HYDROCARBON VAPOURS	SOLVENT VAPOURS	AMINES	PHENOLS
LAKEVIEW THERMAL GENERATING STATION 800 HYDRO RD., MISSISSAUGA ELECTRIC POWER	X	X	X	X		X	X			
PETRO-CANADA PRODUCTS 385 SOUTHDOWN RD., MISSISSAUGA PETROLEUM PRODUCTS	X	X	X	X	X	X	X - PCDDs PCDFs	X		
PPG CANADA LTD. 880 AVONHEAD RD., MISSISSAUGA AUTOMATIVE PAINT & COATINGS		X				X		X		X
RALSTON PURINA CANADA INC. 2500 ROYAL WINDSOR DR., MISSISSAUGA PET FOOD		X								
ASENCE ASPHALT ENGINEERING CORP. 2201 LAKESHORE RD. W., MISSISSAUGA ASPHALT PRODUCTS	X	X				X		X		
ST. LAWRENCE CEMENT INC. 2391 LAKESHORE RD. W., MISSISSAUGA CEMENT	X		X	X			PCB's PCDDs PCDFs	POTENTIAL		
ST. LAWRENCE STARCH 141 LAKESHORE RD. E., MISSISSAUGA STARCH PRODUCTS, CORN OIL		X	X							

INDUSTRIES IN THE CLARKSON AREA

COMPANY	SMOKE	ODOUR	AEROSOLS	SULFUR OXIDES	HYDROGEN SULFIDE	HYDROCARBON VAPOURS	CHLORINATED HYDROCARBON VAPOURS	SOLVENT VAPOURS	AMINES	PHENOLS
TRICIL WASTE MANAGEMENT LTD. 551 AVONHEAD RD., MISSISSAUGA TRANSFER STATION		X				X	X	X		
UNIVERSAL DRUM RECONDITIONING LTD. 2460 ROYAL WINDSOR DR., MISSISSAUGA RECONDITIONED DRUMS	X	X	X	X		X		X		
VYCAN BUILDING PRODUCTS INC. 2457 LAKESHORE RD., MISSISSAUGA ALUMINUM SIDING OVERLAYED WITH VINYL		X								
WESTROC INDUSTRIES LTD. 2424 LAKESHORE RD. W., MISSISSAUGA GYPSUM BOARDS		X								
LAKESIDE ASPHALT LTD. 658 HAZELHURST RD., MISSISSAUGA ASPHALT FOR PAVING	X	X	X	X		X				
GAS SERVICE STATIONS MISSISSAUGA GASOLINE		X				X				